ANNUAL REVIEW AND FORECAST NUMBER

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Textile World

Feb. 28, 1935

VOL. 85, NO. 3—ESTABLISHED 1868

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ANNUAL REVIEW AND FORECAST NUMBER

Textile World

February 28, 1935

Editor: DOUGLAS G. WOOLF

"MOST IMPORTANT . . . "

"JUST what do you think is the most important single thing your branch of the textile industry could and should do during 1935 to render it a more profitable sphere of activity?"

We put that question to a few representative men in each branch. Their replies are printed in the respective sections of this Annual Number.

We did not secure—nor did we expect to secure—a brand new suggestion, a panacea, from this sampling excursion. But what we did get, and what we had hoped to get, was an idea as to the unanimity of opinion with which the industry is regarding its problems. If a majority suggests one way out, we argued, the chances are good that in that direction lies our main hope, and also that steps will be taken in that direction. . . . . That shows our faith in majorities. We still don't believe they are often wrong.

▼

The "way out" proposed by the majority was merchandising. Some called it just that; others pieced together several parts of this phase: pricing policies, supply-demand balance, promotion, new-product development, etc., etc. In other words, while modernization, technical progress, labor relationships, and other phases were listed as important, by far the greatest number seemed to feel that it didn't make much difference what else you did if you still didn't sell your product at a profit. And, it seems, most of them are agreed that the average textile manufacturer is not too fussy on the latter score; he is apparently willing to produce goods even though he knows he is going to take a loss on them. And so, out of all the "most importants" we pick the "*most* most important": improved merchandising policies.

Now, that isn't as simple as it may sound. In fact it isn't any one thing. And, since we asked manufacturers who contributed to this symposium of thought to be specific rather than general, we think it only fair that we should do likewise.

So here's a specific thought as to the one most important thing this symposium indicates each branch of the industry could and should do to provide a sounder price structure: It should be in a position to make *rapid* shifts in its production schedules so as to preserve a fine balance between supply and demand. Note the word *rapid*. Any time-lag is fatal. Necessity of delay pending a hearing or an administrative decision renders any such plan useless.

Just study the statistics on production and consumption in most branches of the industry. They are not far apart at the end of the year. It isn't total over-production that wrecks prices; it is temporary conditions of over-supply, inducing panic and the other well-known symptoms of price hysteria. The industry itself should be permitted to regulate its output just as soon as those periods threaten. It wouldn't take much curtailment as a corrective so long as it was done quickly enough. One branch of the industry, working out such a plan last year (which incidentally was not approved by NRA) suggested that it be permitted to curtail up to 15%. Personally we believe that, once the plan were really effective, this leeway would be ample. Compare that with some of the radical curtailment programs that have been necessary in the past!

▼

As we stated above, this plan has had consideration. Frankly, we believe it would have been approved if the U.T.W. hadn't started its guerrilla warfare just about that time. In common with other constructive plans, this had to be shelved for a while. We recommend that it be taken off the shelf again and be considered by *all* branches of the industry.

It's the "most important" start in the right direction for the industry and its workers that we know of. And after all it is necessary to start before one goes places.

Douglas G. Woolf

TYING UP THE PACKAGE

ONE of our good friends never concludes a job without trying to "tie up the package," as he puts it. That is what we want to do here. We want to be sure that our readers get, at the start, the plan on which this Annual Review and Forecast Number has been constructed. It will help them, we are confident, in getting the most out of the issue; and it will help us in insuring the maximum results for our editorial effort.

As is true with each issue of TEXTILE WORLD, this Annual Number is based on two-way planning. First, there is the coverage of the several major branches of the textile industry: Cotton, Wool, Rayon, Silk, Knit Goods, Processing, Engineering. Second, there is the coverage of the major cross-sectional phases of the industry, such as Management, Merchandising, Men, Materials, Methods.

The way in which we have secured the first type of coverage will be obvious on even casual scanning of the issue. Following this General Section, we present (commencing on Page 103) a series of Special Sections, each devoted to one of the major divisions of the industry, and each introduced by a distinctive section-cover.

The plan whereby we have secured the second type of coverage—that of cross-sectional interests—extends through both the General Section and the Special Sections. In the former, we present a series of high-light articles outlining concisely the progress made by the industry as a whole in those phases which we regard as most vital at this particular stage. Thus, there is treatment of the general statistical picture of the industry (Page 82); the broad experience in operating under NRA codes (Page 85); the status of employer-employee relations (Page 86); the avenues open for further cost-reductions under present conditions (Page 88); the break-down of major elements in costs of representative textile products (Page 90); trends in merchandising (Page 92); the status of foreign trade in textiles (Page 93); and the probabilities as to the most favored fabric types in 1935 (Page 95).

Then, going from the general to the specific, we trace the development of certain of these trends in each branch of the industry, in its respective Special Section. Thus, for each division, we interpret progress in economic status, in merchandising, in code operation, in associational activities, in raw-material supply, in mill methods, and in research. Each of these Special Sections is rounded out by the inclusion of a brief chronological summary of major events, a page of practical helps for operating executives, and by a symposium of views of representative manufacturers on the challenging question: "What is most needed by your division of the industry in 1935?"

Through this plan, we believe the 1935 Annual gives to each reader not only a picture of progress in his particular field, but a broader reflection of the trend of the industry as a whole—so vital in these days of increasingly close inter-relationship.

Throughout this issue, we have not confined ourself to the reportorial treatment. We believe that the day of straight reporting passed long ago for the business paper. Its major function today is an interpretative one. In performing that function in this issue, we have veered frequently and consciously toward the editorial treatment. We make no apologies for this; we regard it as a vital feature of such a publication.

Consequently we see no need for further editorializing here on the major specific problems facing the industry. We shall relax, and devote the remainder of this page to some odds and ends of thinking which we have stored up for just such an occasion.

FROM THE EDITOR'S BRIEF CASE

Strictly Personal

THIS is a personal message, and so the editorial "we" will be waived. I have been associated with this publication for nearly 19 years. During that time, I have known quite a number of textile manufacturers and have been in touch with many types of thinking.

I have asked many individuals the question: "What are you working for in this textile business, anyway?" Often, the answer is: "To make a profit for myself and my stockholders." I don't think that does them justice.

I realize that most of us have the primary responsibility of making as decent a living for ourselves and our dependents as we can. I also realize that some bear a position of trusteeship to stockholders, as one manufacturer puts it in this very issue. Those responsibilities must be fulfilled; in fact they are impelling forces toward progress.

However, in the great majority of textile manufacturers I have met, I have found another and a broader motive: a sense of social responsibility. I know that thought is often derided; but I also know it is true.

Now, these two motives—financial and social—are not necessarily in conflict. By social responsibility, I do not mean philanthropy; I do not mean, necessarily, the impulse to what was once called "welfare" work—even though that, too, has been essential under certain types of conditions. I mean, rather, the sense of broad responsibility which, I have found, most manufacturers feel toward their employees, toward the community, toward the public.

Many of those men will themselves deny its existence; but that is somewhat like the little boy professing toughness to avoid the appellation of "sissy." Self-seekers outside the industry will also deny the existence of this sense of responsibility.

But I know it exists. And the only purpose of this message is to urge manufacturers not to become "hard-boiled" just because certain trends discourage them. Social responsibility is more necessary today than ever before. It is in fact the most indispensable part of our industrial structure, if the pressing problems facing us now are to be solved.

Where Do We Go From Here?

THAT'S an appropriate question for an Annual Number.

Well, for one thing, we are going further in the direction we have started. The NRA, as such, may and undoubtedly will become a memory. But some of the things we have been attempting in that experiment will become basic parts of our economy. There will be interludes of reaction, of course, but it is unthinkable that we can ever go back permanently to what many call the "good old days."

And so it would seem that one good move for 1935 would be to get away from the academic question of whether one is "for" or "against" the policies of the Federal Administration which happens to be in power today. Or at least that discussion can be confined to pre-election campaigns. Of much more potential benefit is the discussion of just what we are going to salvage and what we are going to discard. With that as a basis, we can then go ahead and shape something of permanent value.

CHECK & DOUBLE-CHECK

We look back to 1932 to see what good pickers we were

IN OUR 1932 Annual Number we presented a series of articles describing worth-while jobs done by specific textile manufacturing companies during the year of our depression, 1931. We pointed out, at the time, that they did not by any means represent all the successful accomplishments in the industry, nor necessarily the most outstanding ones. Instead, the case-studies were selected with a view to reflecting variety in product, size, and other circumstances.

We are now checking up on ourselves, to see what has happened to the companies since then. Below are brief progress reports on these cases.

We admit we are good. All in all, we think we picked 'em pretty well back in 1932.

Adams-Millis Corp.: Stressing modernization of machinery, Adams-Millis Corp. held closely to its policy of conservative management and careful planning during the years 1932-35. That this policy was sound is evident, as every year since 1931 the company has shown a nice profit. No changes have been made in manufacturing or merchandising policies that were in effect prior to 1932.

Sidney Blumenthal & Co.: They credited their good 1931 showing to three main factors—quality, firm prices, and merchandising effort. Despite price weakness, the company adhered rigidly to its policy of quality maintenance and forceful merchandising. As a result, Blumenthal has survived the depression with increased prestige. In 1932 the firm suffered a net loss of $1,895,550; in 1933 the loss was cut to $164,125.

Brunswick Worsted Mills: In 1932, Brunswick was operating 32 looms, without spinning or finishing equipment, in a rented building in Central Falls, R. I. In May, 1933, a plant was purchased in Moosup, Conn., and the machinery moved. Since then, dyeing and finishing equipment, 2,800 spinning spindles, and 20 additional looms have been installed. The record speaks for itself. The article we wrote in 1932 emphasized that a small unit, to cash in on the advantage of flexibility it possesses, must be primarily a one-man mill, and that 48 looms on fancy worsteds were about the maximum. Brunswick, with 52 looms, has hit this figure pretty closely.

Callaway Mills: They feel that, considering general conditions, their plan of "selective diversification" has continued to be successful. New markets are being developed, and products improved through research. Among additions to their fabricated lines are cotton trousers and wind-breakers. The company anticipates that its established policy will be broadened as required.

Chatham Mfg. Co.: This company not only continued its aggressive policy of advertising in consumer magazines and sponsoring department store promotional sales—it appropriated more money for the purpose, concentrating on the department store promotions. During the period of 1932-35, production expanded, sales held up well, and the company added to its line a new product, a homespun fabric for men's wear.

Collins & Aikman Corp.: Few firms rallied more quickly from 1932 than did the Collins & Aikman Corp., this being ascribed to the same policies which made for 600% profit increase in 1931—low inventory, management economy and sound merchandising. These policies have been continued. The year ending Feb. 25, 1933, showed a net loss of $522,001.47. However, in the year ending Feb. 24, 1934, the firm reported the impressive profit of $1,294,493.44.

Goodall Worsted Co.: Integration is just as sound a policy today as in 1931; such is the belief of the Goodall Worsted Co. Indeed the company is more than ever convinced as to the soundness of its decision to manufacture suits. Goodall reported good earnings in 1931, the first year of integration, and since then, with the exception of 1932, the company's sale of Palm Beach suits has gone up rapidly. Goodall's report for 1932 showed a loss followed by healthy profits in both 1933 and 1934.

Gotham Silk Hosiery Co.: "Elasticity of mill schedule" was the answer made by the Gotham Silk Hosiery Co. early in 1932 to the question, how did the company manage to increase profits in 1931 when many textile firms were falling into the red? The company continues to keep finished stocks at minimum, finishing them only on actual order. In 1932 Gotham reported a loss, which, however, was converted in 1933 to a net profit of $96,399.87.

Greenwich Mills: "Standardized quality" was the story of 1932 and Greenwich has stuck by its guns. With the trade demanding lighter fabrics, these lines have been more popular, but they represent a product that Greenwich has made for years, although on a more limited scale. Greenwich has continued to be a financial success and money has been made consistently, except for those periods when the entire industry has been demoralized.

Hamilton Woolen Co.: One of the features of the Hamilton management which took control late in 1927 was that all the facts in a given situation were examined with great thoroughness—and then action taken quickly and decisively. After numerous labor disturbances starting last September, the management studied the situation minutely and in December decided that further operation of the plant would imperil the workers and bring additional losses to stockholders. On Dec. 22 the directors recommended liquidation and the stockholders approved overwhelmingly on Jan. 15. Since 1932, the financial record is: $39,617 profit in 1932; $283,104 profit in 1933; $375,167 loss in 1934. The plant was sold to J. P. Stevens & Co. in February.

Manville-Jenckes Corp.: The policy which led the Manville-Jenckes Corp. in 1932 to perform what we termed in these columns a "major operation" by giving up its Pawtucket plant has been followed consistently to date, as witnessed by the present intention to liquidate the two southern properties. This is a further step by the company to protect working capital and make its major properties—the Manville plant and the Woonsocket Rayon Co.—impregnable. Probably the best indication of the company's progress under the present management is the fact that bank indebtedness has been reduced $4,500,000.

Toledo Dye Works: In our 1932 Annual Number, referring to the Toledo (Ohio) Dye Works, we told of "the phenomenal rise in three years of this finishing plant against an inherited reputation for poor quality and service, disadvantages of a location removed from textile centers, and the depression." This progress has continued, according to J. D. Lippmann, vice-president, who informs us that in 1933 sales increased 35% over 1932, and in 1934 70% over 1933. Operations, he reports, have been expanded considerably.

Van Raalte Co.: Timeliness in merchandising policy might be viewed as the secret of the creditable showing that the Van Raalte Co. has made through the depression. In 1931, the firm adopted original and daring promotional methods, and these were so successful that for the first time in four years, Van Raalte paid a dividend. The company showed a heavy loss in 1932, due to general conditions. Later, selling policies were modified and merchandise promoted conservatively. It is clear that this was wise, as the firm's report for 1933 showed a profit of $143,881.

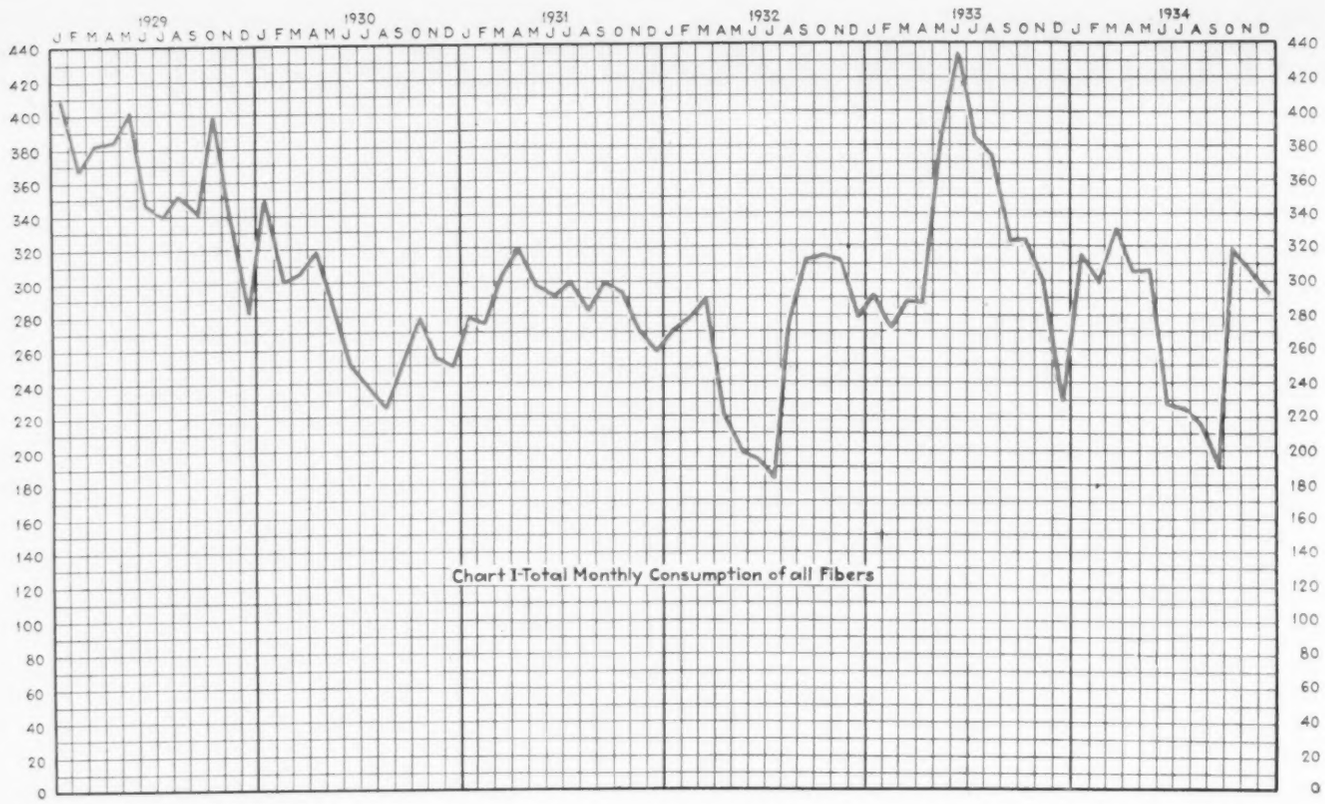


Chart I-Total Monthly Consumption of all Fibers

WHAT? NO RECORD?

1934 a dull affair compared with the low and high of 1932 and 1933

STATISTICALLY, the textile year 1934 was a bust. It set neither a low nor a high record for mill activity. And after two years of both kinds, this was pretty much of an anti-climax.

It did look for a while as if September might plumb new depths, but that expectation failed to materialize. July, 1932, still holds that questionable distinction. We sympathize with Francis Gorman in this disappointment. He might at least have gotten out of the strike the satisfaction of establishing a record.

All the 1934 grief was centered in the four months from June to September, as will be noted in Chart I on this page, showing textile activity. Things were pretty low during the first three of those four months, before the shooting started, and then they dropped some more during the actual engagement. The other eight months, it will be noted, look as flat as the proverbial pan-cake on the chart. In fact, if it hadn't been for Gorman, 1934 might have been a completely stupid year.

The net decrease in textile mill activity last year, as against 1933, was 14½%. This is based on total consumption of raw materials. Since 1933 was quite a year, this comparison doesn't speak so badly for 1934. In fact, as related to the 1923-25 average as the base, 1934 was only 11% below this "normal," as will be seen from the following table:

(1923-1925 Average = 100)

1929	115
1930	89
1931	93
1932	83
1933	104
1934	89

It will be noted that 1934 was the same as 1930; and that it did not reach the 1932 low. Once more, it is pertinent to emphasize the relative stability of the industry in so far as activity is concerned; there is a restricted range between the low and the high year. From the preceding table it will be seen that 1929, the peak for the

CHART I (above)—TREND OF GENERAL TEXTILE ACTIVITY is based on total monthly consumption of raw material, charted directly, in hundreds of thousands of pounds. Relative trends of individual fibers are shown in Chart II and relative price movements are shown in Chart III, both on opposite page.

period under review, was only 15% above "normal," while 1932, the low, was only 17% under.

Taking up the fibers individually, wool and silk exchanged the roles they had performed in 1933. In that year, wool consumption increased 35% and silk consumption decreased 15%—both as against 1932. In 1934, wool consumption took a drop of 22% from the previous year, while silk gave the best performance of any of the textile fibers, declining only 1½% from 1933. Cotton was 13%, and rayon 4%, off.

On the subject of this relative standing of the several fibers, Charts II and III are of interest. These show trends in consumption and price of cotton, wool and silk from 1923 to 1934, inclusive. It will be noted from Chart II that the consumption trend in both cotton and wool was sharply downward, while silk was nearly side-ways. Chart III, on the other hand, shows price trends of cotton and wool going up, and that of silk going down. Offhand, this might seem to support the thesis that consumption moves in inverse ratio to price. Unfortunately, going back just one year further, we find cotton and wool advancing in both use and price, and silk declining in both. So that's another good theory gone wrong for the moment.

Now, we come to the sad part of our story: financial return, or rather lack of return. The Federal Trade Commission's survey gave a hint of this when it showed that the industry lost money during the two months immediately preceding the strike. Such few 1934 financial statements as have been issued thus far indicate that this was true for the year as a whole. These are insufficient testimony, but certainly there is no doubt that 1934 would not be classed as a profitable year in textiles.

Coupled with this trend was a minor wave of liquidation—not symptomatic we are confident, but sufficiently disturbing to make some feel rather unhappy. As we noted last month, we do not consider this pessimism justified. In fact, there are sufficient encouraging trends in practically all branches of the industry, and enough improvement in the production-demand balance, to encourage us in the belief that the textile industry is making definite progress.

For 1935, we believe there should be an increase of at least 10% in textile mill activity over that of 1934. We consider this a conservative estimate. If it proves reasonably accurate, it will mean that 1935 will be about a "normal" year, based on the 1923-25 average.

As to profits, they will depend—as usual—upon how philanthropic textile manufacturers feel.

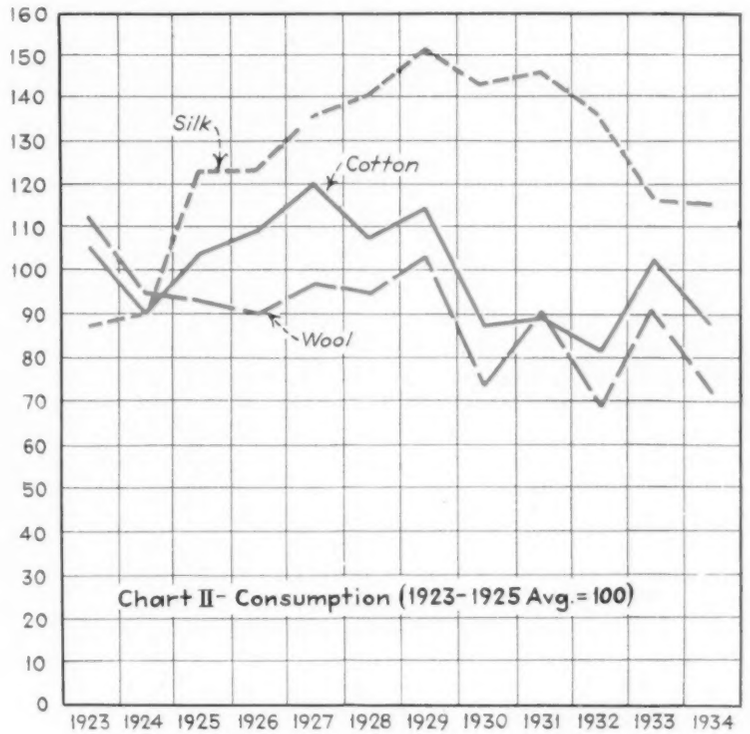


Chart II- Consumption (1923-1925 Avg.=100)

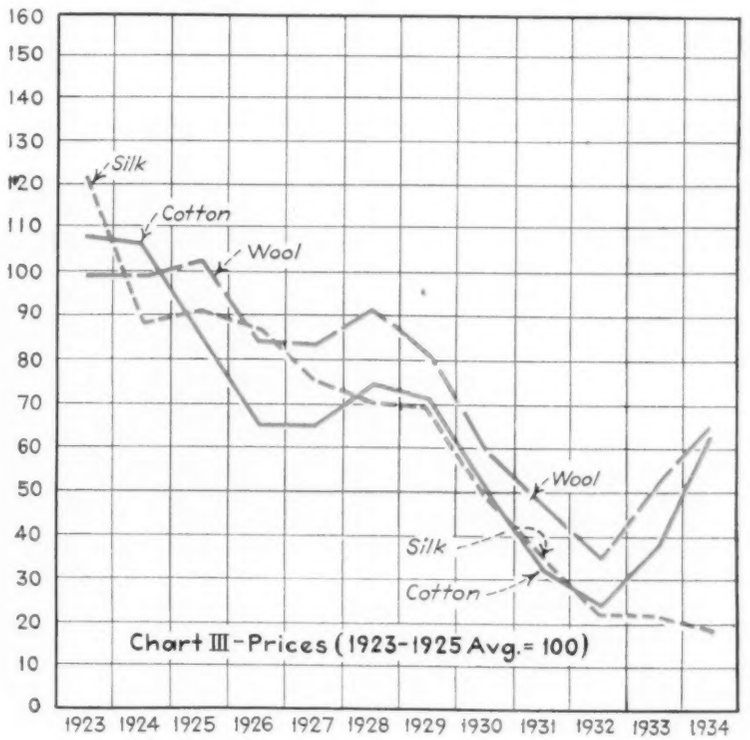


Chart III-Prices (1923-1925 Avg.=100)

CHARTS II AND III—ACTIVITY AND PRICE TREND SINCE 1923. Chart II, above, and Chart III, below, show activity and price trends, respectively, in cotton, wool and silk from 1923 to 1934, inclusive. Rayon, which enjoyed its major production rise during the period, is not included as it is out of all proportion to the three older fibers. Both charts are plotted from index numbers, with the average of the three years 1923-25 as the base, 100. In other words, the curves show, for each year, the relationship of the fiber's behavior in that year to the base period in terms of percentage. Chart II is based on yearly consumption of the fibers; Chart III on TEXTILE WORLD'S *price index numbers.*

Textile mills can revive their

TRADITIONAL PROSPERITY

By A. D. Whiteside

Member, National Industrial Recovery Board

◆ *Mr. Whiteside offers to the textile industry, through* TEXTILE WORLD, *a most challenging but at the same time a most hopeful message. He speaks from intimate knowledge, as he is president of Dun & Bradstreet, Inc., was a Division Administrator under NRA, and some years back headed the Wool Institute. He expects textile men to be the leaders in a new era of industrial self-government.* —Editor.

FOR at least a century previous to the World War the major manufacturing fabric divisions of the textile industry were above the average in consistency of profits. Productive facilities under the operating schedules then generally followed maintained a fair balance between the number of pieces of fabrics produced and the current cloth consumption.

As few mill failures or liquidations took place, capital earning requirements were fairly equalized. Style changes were infrequent and buying methods were in keeping with the requirements for economy and stability in production.

Since the War, revolutionary changes of a fundamental character have taken place in the industry which have violently distorted its equilibrium.

Rapid changes in style have called for a flexibility of production methods and have injected a recurring hazard into the traditional textile plan of operation.

The multiple shifts inaugurated to meet the military demands and the consequent overburdening of the looms released for civilian purposes, disrupted the former balance. As the vital factor in the new method of utilizing production facilities centered in maintaining each mill at maximum production, only a small percentage of the efficient units were able to show a moderate profit on extremely heavy turnover.

As a result of the continuous cutting of prices in an endeavor to maintain maximum production, operating losses depleted capital structures which threw tens of thousands of looms on the market at liquidation or bankruptcy prices. When this equipment changed hands the new owners of these mill properties were in a position to figure selling prices without being compelled to include in their costs the requirements for capital earnings or depreciation, which culminated in completely demoralizing the price structure.

The textile picture was not reassuring in the spring of 1933, as cooperative action which had been attempted had not met with signal success and the predicament of the textile mills was one of major importance in the deplorable situation which confronted this country.

The National Industrial Recovery Act presented an opportunity which gave definite promise of relief from a condition which presented many aspects of dangerous significance, as the textile mills of this country and those performing supplementary processes normally employed more than a million wage earners.

There is at present a widespread lack of appreciation on the part of textile men as to the potentialities of the permanent relief which may be obtainable, particularly by this industry, under the provisions of the National Industrial Recovery Act. Irrespective of how much or how little the textile industry has benefited from the Codes of Fair Competition up to this time, the results so far are not a criterion of what may be accomplished through industrial self-regulation under mandatory provisions when properly administered.

The attempts to work out this complicated textile problem which have been made have been merely the introductory approach to industrial self-government which will ultimately bring back to the fabric mills of this country and those in secondary processing, the traditional prosperity to which they have been accustomed for generations previous to the World War.

These mills in all probability under the revised extended act will have an opportunity to profit by the experience of the last eighteen months in planning their progress toward a new era of satisfactory development. It will require time to attain this objective, but the possibilities of relief under the act and the proper administration of the law have not as yet been even remotely explored.

The attempt made in that direction should not discourage even the most pessimistic, because when industry knows what it should have, and when industry has rounded out its consciousness of its responsibility to itself and to each of the other major factors affected by its actions, the highest form of industrial civilization will inevitably follow.

And, irrespective of the results attained up to this time, the textile men of this country must know that they possess the intelligence, the ability, the determination and the fundamental common sense which will serve to elevate this group to the rank of leadership in solving the vital problems which lie directly ahead of all industry.

I am confident that the men in the textile industry will be one of the first, if not the first, to find the answer to the social-economic enigma, which is not only the primary consideration before this country, but is even more acutely in evidence in every civilized country in the world.

STILL STANDING UP . . .

Textile codes remain efficient instruments, despite U.T.W. attack

NRA codes have worked far better in most branches of the textile industry than in the great majority of American industries. The textile codes are still standing up as effective instruments; they are neither dead nor dormant as is true in some fields, and as might have been expected to result in textiles in view of the vicious attack made upon the codes by the U.T.W. last September. The majority of textile manufacturers would regret the scrapping of the major provisions of their codes.

These positive statements are made in the full realization that here and there they will be questioned. A certain percentage of manufacturers is honestly opposed to the whole idea of the codes; another group likes to "belly-ache"—and so always criticizes, never approves. But the *majority*, we are sure, shares the view just expressed.

Going even further, we believe it is possible to record certain benefits resulting from the codes which were not necessarily within the purpose of the NIRA—and consequently may be considered as so much "velvet." The codes have given cohesion to the different branches of the industry. They have revivified the trade associations with the result that self-government in textiles is on a higher level today than ever before. We hope—and believe—that the next step will be a further coordination among branches of the industry such as we have been advocating editorially during the last year. If and when that stage comes, it can be written down as one more accomplishment to which the NIRA contributed, even though incidentally.

Finally, there have been specific results—such as the advance made in the war on design piracy, for example—which in themselves are almost worth the price of admission.

So much for general observations. Now, as to the major specific problems involved. In discussing these, however, it should be noted that this particular article is merely a high-light summary; details for the various branches are recorded in the respective sections.

1. WAGES AND HOURS: There is one problem under this heading which transcends in importance all others in this classification: wage differentials. This question is discussed in the industrial relations article of this issue and will not be dwelt upon here.

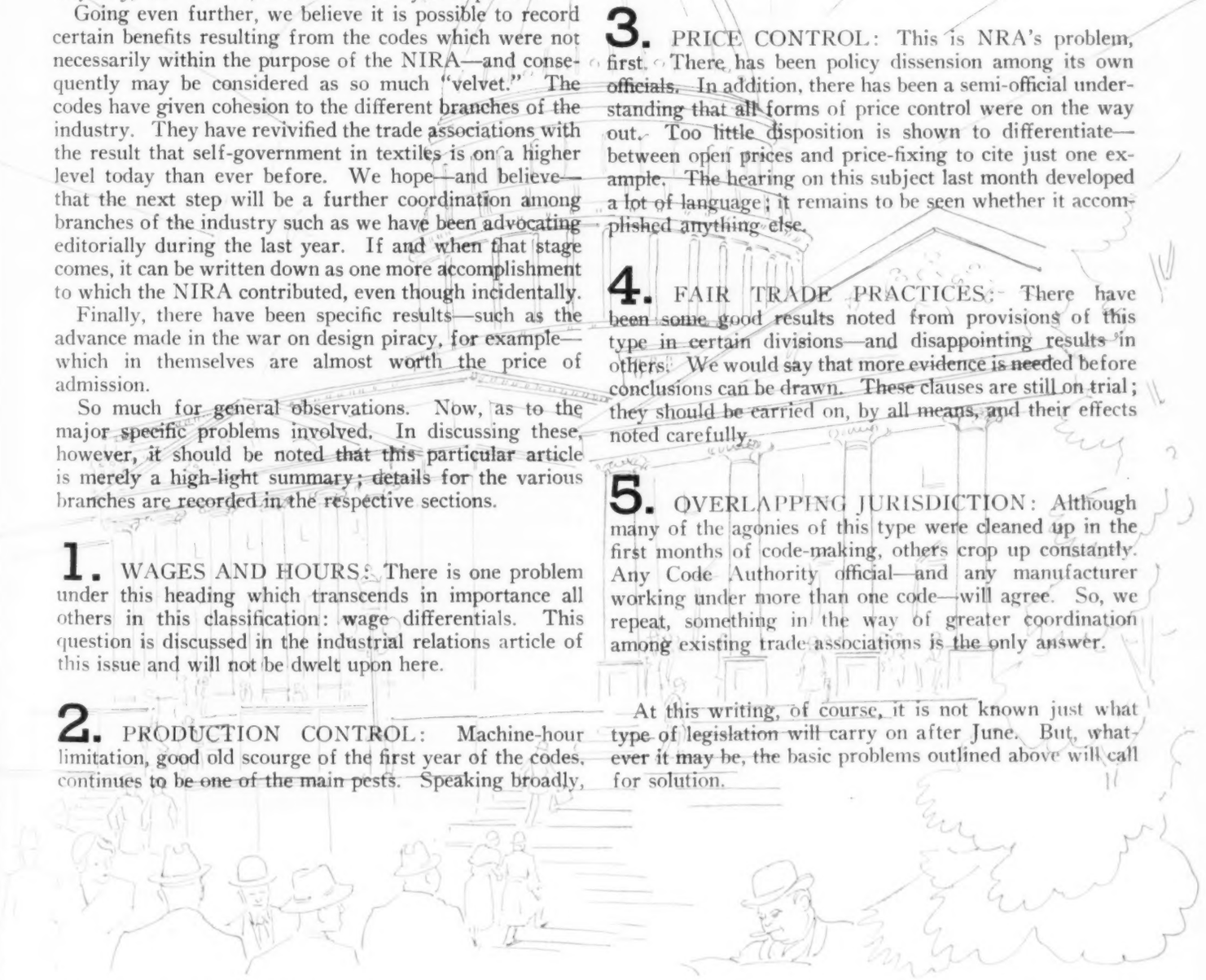
2. PRODUCTION CONTROL: Machine-hour limitation, good old scourge of the first year of the codes, continues to be one of the main pests. Speaking broadly, it is safe to say that the majority of manufacturers still favor the restriction to a maximum of two 40-hr. shifts, as written in most of the codes. It is also safe to say, however, that the opposition minority has been gaining ground in recent months. This is still a subject which is very much alive. During the year, the counter-proposal of a manufacturer in one branch was turned down, a request for exemption by a large mill in another branch was granted, and other needs for exceptions on the part of certain small companies were recognized. In one division, there has been a different type of movement stirring: a proposal for a single shift of 40 hours. Altogether, it looks as if each Code Authority would be wise to count this as No. 1 problem for 1935.

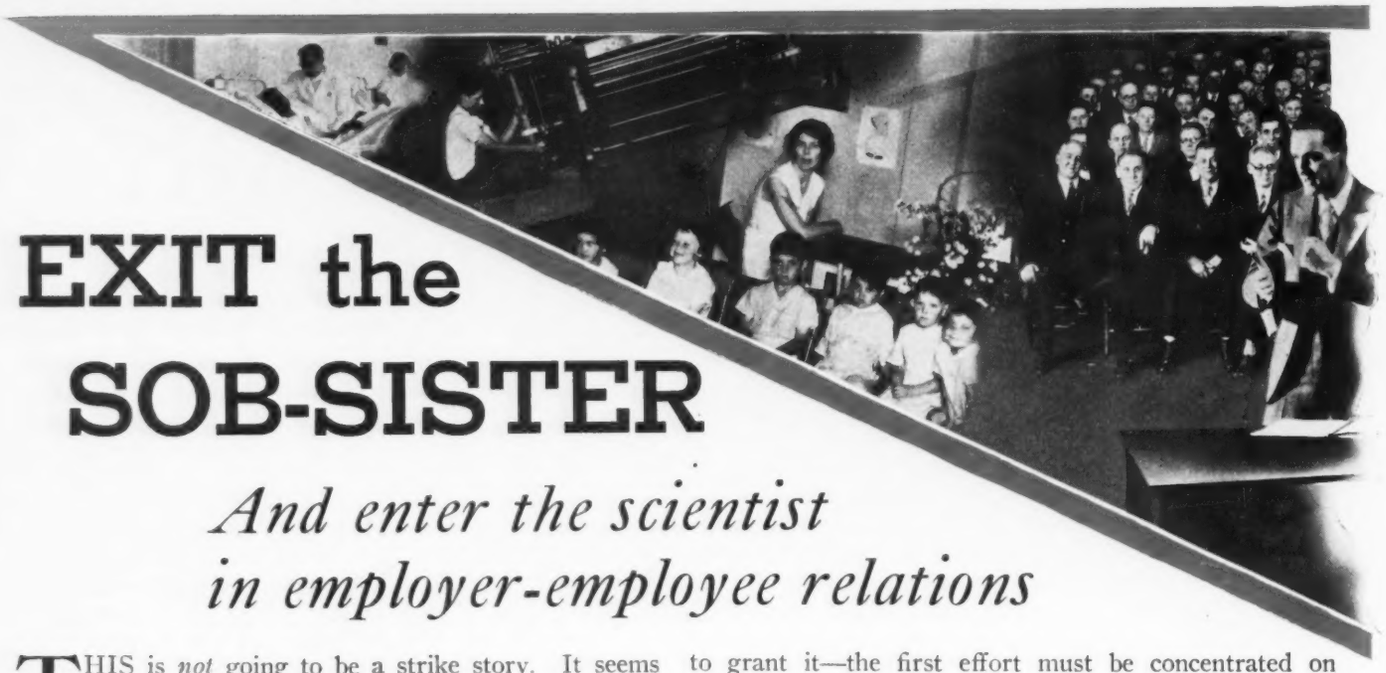
3. PRICE CONTROL: This is NRA's problem, first. There has been policy dissension among its own officials. In addition, there has been a semi-official understanding that all forms of price control were on the way out. Too little disposition is shown to differentiate—between open prices and price-fixing to cite just one example. The hearing on this subject last month developed a lot of language; it remains to be seen whether it accomplished anything else.

4. FAIR TRADE PRACTICES: There have been some good results noted from provisions of this type in certain divisions—and disappointing results in others. We would say that more evidence is needed before conclusions can be drawn. These clauses are still on trial; they should be carried on, by all means, and their effects noted carefully.

5. OVERLAPPING JURISDICTION: Although many of the agonies of this type were cleaned up in the first months of code-making, others crop up constantly. Any Code Authority official—and any manufacturer working under more than one code—will agree. So, we repeat, something in the way of greater coordination among existing trade associations is the only answer.

At this writing, of course, it is not known just what type of legislation will carry on after June. But, whatever it may be, the basic problems outlined above will call for solution.





EXIT the SOB-SISTER

And enter the scientist in employer-employee relations

THIS is *not* going to be a strike story. It seems necessary to announce this in advance, so that our customers will not feel cheated later on. Obviously, they might expect that an employer-employee relations article in a textile publication at the end of the year of U.T.W. 1934 would deal with the strike. But, we repeat, this one will not.

We do not mean to infer that strikes are not a 1935 issue. On the contrary, we regretfully express the opinion that they are going to be very much an issue —and that those textile manufacturers who are not prepared for trouble this year may get a rude awakening.

Our real reason for avoiding the topic is that this article represents an attempt to outline some of the positive and constructive things the textile industry can do about its industrial relations. It can be neither positive nor constructive on the strike question at this particular time; nor can it be at any time while the present leadership of the U.T.W. remains.

About all that can be done on this score is defensive in character.

Nor is this going to be an NRA story. There is a temptation, of course, to wander into the controversial fields of 7A, collective bargaining, majority rule, etc. But here, again, we do not recognize an opportunity for positive, constructive action of a specific nature, on the part of textile manufacturers.

Furthermore, even if there were no such question as that of unionization, and even if the 7A controversy were solved to the delighted satisfaction of everybody (which, incidentally, is imagination gone wild) there would still be an employer-employee problem to be solved. And it is that particular problem with which we are concerned in this article.

1. WAGES: What is the most important single consideration involved?

Wages, of course.

We believe the great majority of students of industrial relations eventually come to that conclusion. And it applies not only to textile workers but to employees in every other industry, to white-collar workers, to executives—yes, and to editors.

Granted this—and we are afraid our readers will have to grant it—the first effort must be concentrated on problems arising out of wage structures. Of these, we believe that easily the most difficult one is the question of wage differentials. Under the codes, it is this zone that is the last battleground of wage-chiselers. The problem cannot be dismissed by the statement that the great majority of textile manufacturers have not made the minimum wage the maximum wage—even though that statement is absolutely true. Nor is it enough to say that the majority have attempted to maintain equitable differentials between occupations—even though that too is true.

The fact remains that chiselers—and they haven't been banished by the NRA—attempt to do the former and not to do the latter. This complaint does not come from employees alone; we hear it constantly from employers themselves who find in this practice a particularly unfair form of competition. This problem is one of the most important for thoughtful consideration by individuals and by their associations—not only for the improvement of employer-employee relations but for the advancement of the economic status of the industry itself.

Allied with this subject is the problem of competitive wage situations between branches of the industry. This is particularly acute in certain instances. It demands attention.

Finally, in the wage zone proper, there is the question of bonus systems and wage incentives. Here is a fertile field for progress. It is a field, however, which requires scientific, not emotional, treatment. Engineers and management experts are needed.

2. WORK ASSIGNMENTS: This leads logically into what we regard as another vital problem facing textile manufacturers: that of the so-called stretch-out. Here, in line with the specifications stated at the beginning of this article, we are considering this from the positive, not the negative, angle. We are ignoring, for the purposes of this discussion, the use of the stretch-out issue as a football for union propaganda.

There still remains the real aim of the stretch-out as merely one phase of scientific management; the utilization of improved methods and improved machinery to

The Author Says:

"The textile industry can be neither positive nor constructure on the strike question while the present leadership of the U. T. W. remains. . . . ."

•

"What is the most important single consideration involved in industrial relations? Wages of course. . . . ."

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"There still remains the real aim of the stretch-out as merely one phase of scientific management. . . . ."

"Most of the post-war employee-representation plans developed into pleasant little groups where workers discussed the care of shrubbery. . . . ."

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"This subject we are discussing is not a 'labor' problem; it is an acute managerial problem. . . . ."

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"The sob-sister and the ballyhoo artist have no place in the field of industrial relations. . . . ."

lift the status of individual workers and to broaden the market for the industry's profits through cost reduction. We have written enough on this subject in recent issues to make our position clear; we merely commend it again as one warranting the most careful study.

3. SELECTION AND TRAINING: Still another great group of problems embraces those concerned with the selection and training of employees. By selection, we do not mean merely the weeding-out of the physically and morally unfit. On the contrary, we mean the scientific study of applicants and apprentices so that each may be located in the occupation best suited to his or her qualifications. This is the province of the personnel manager. It is sometimes argued that a small mill cannot afford such a "luxury." This is begging the question; in such an organization the proprietor himself may have to be the personnel manager, but at least there must be some one whose attention is concentrated on this particular problem.

Similarly, by training we do not mean merely the schooling of apprentices. Instead, we are referring to educational effort from the top down: a type of effort which distinguishes an efficient from an inefficient organization. Obviously, this means starting with the foremen. In fact—and we want to place particular emphasis upon this thought—out of the welter of so-called welfare or community activities which sprang up during the post-war era of labor scarcity, we recognize only one that earned for itself an assured place in industrial relations: foreman training. Here, too, the size of the mill is not the deciding factor. We have seen successful efforts in this direction in great organizations and in one-man companies.

4. EMPLOYEE REPRESENTATION: Just the mention of those hectic post-war days in industrial relations brings to mind the various employee representation plans which were launched. We followed most of them carefully at the time; were enthused—often unduly, we admit, over some of them; and were disillusioned as one after the other failed to stand up under changing economic conditions.

Most of them had one or more of three faults: They were too cumbersome; and/or they were plain ballyhoo; and/or they were psychologically unsound. The first two errors explain themselves. The third was graphically portrayed for us by a manufacturer who entered a company where one such plan was in operation—and who discarded it speedily. "Why did I do it?" he said in answer to our question; "merely because I decided that it was the bunk to ask a group of employees to get up in meeting and cut their own wages. It's against human nature. If a wage-cutting operation must be undertaken, get it over with as painlessly as possible but don't ask the patient to wield the knife."

The result is known to all students of those plans. Most of them degenerated into pleasant little groups where workers discussed the care of shrubbery and the maintenance of a safety organization. In fact, we have come to the conclusion that the safety problem seems to be regarded as about the only ground on which employees can be brought together—just as violation of the Federal income tax laws seems to be the only ground on which gangsters can be brought to an accounting. (The metaphor is a clumsy one and subject to incorrect inferences—but we hope you get the idea.) Obviously, a safety organization is *not* employee representation.

We find we have violated our promise and have been negative on this point. Our reason for this is that we do not find, in the textile industry's experience with employee representation plans, either a significant or a clear-cut trend which may be used as a guide for the future. Nevertheless we do not want to be misunderstood. We believe very definitely that the development of satisfactory plans of this type is absolutely essential—especially in those companies where size precludes the so-called family spirit. And let it be said parenthetically that many manufacturers believe they still have that family spirit long after it has disappeared.

The demand, then, is for a careful evaluation of past attempts and an equally careful study of the experiences of other industries. This, too, is a fertile field. It promises rich returns—not as a defensive measure against organized labor, but as an offensive attack upon the economic woes of both employers and employees.

In this relatively brief space, we have attempted to high-light some of the more important specific problems in textile industrial relations. Many other broad questions—such as, for example, social insurance—demand, first, concentrated national thinking in order that subsequent action may be practically as well as theoretically sound.

But something can be started at once on all the four phases outlined in this article: *Wages, work assignments, selection and training, employee representation.* In fact, if a sound start is made in these four directions, more will have been accomplished for the industry than is possible through any single effort we know of.

In the attack upon these problems we urge again the approach, not only by individuals, but by the industry's associations.

Finally, we would re-emphasize one thought which we have stated repeatedly in the past: This subject which we are discussing is not a "labor" problem; it is an acute managerial problem.

The sob-sister and the ballyhoo-artist have no place in the field of industrial relations. It is the province of the engineer and the scientist.

A DOLLAR SAVED

Is still a dollar earned, although legitimate economy measures are fewer

◆ *In looking over the government-supervised map of Modern Industry we find that, although there is an impressive array of actually and potentially closed avenues to Savings, far more avenues to that popular resort are open and likely to remain open than are closed or likely to be closed.*

IN MANUFACTURING there have always been only two legitimate ways to make money. One way has been to place selling prices above costs. The other has been to place costs below selling prices. In days of stringency and under-consumption the first method has been a most difficult if not quite impossible one. The second method, at least by comparison, is good at any time. It is, generally speaking, the more popular today.

A dollar saved is still a dollar earned, although some of the avenues to savings—always dangerous anyway—have been cut off, supposedly (and probably) for our own good. Gone are the days when wages could be reduced as low as necessity seemed to demand. Gone are the possibilities for thinning out costs per unit of product by extending the hours of operation of men and machines. Certain branches of our industry are not allowed to accomplish this thinning out even by expanding their plants. The principle of the processing tax threatens to cut off hope of savings in raw-material costs. In many cases, restrictions prevent the hiring of long-time apprentices to work at low wages.

There are indications that other avenues to savings which are open today may be closed tomorrow, and perhaps we should begin to accustom ourselves to getting along without them. We can still hire men for peak loads and let them out when slack periods return, but we know that steps are likely to be taken soon to insure stability of employment—and most of us will welcome them. At least the time is definitely in sight when industry as a whole will have to assist in carrying reserves against the unemployment of its workers. There is to be less advantage to industry as a whole in discharging the incapacitated men and women of advanced years, since it will be obliged to help support them anyway. The "truth-in-fabrics" movement promises to lead to an enforced labeling which will make impossible the use of inferior materials and workmanship without compensatory reduction in selling prices.

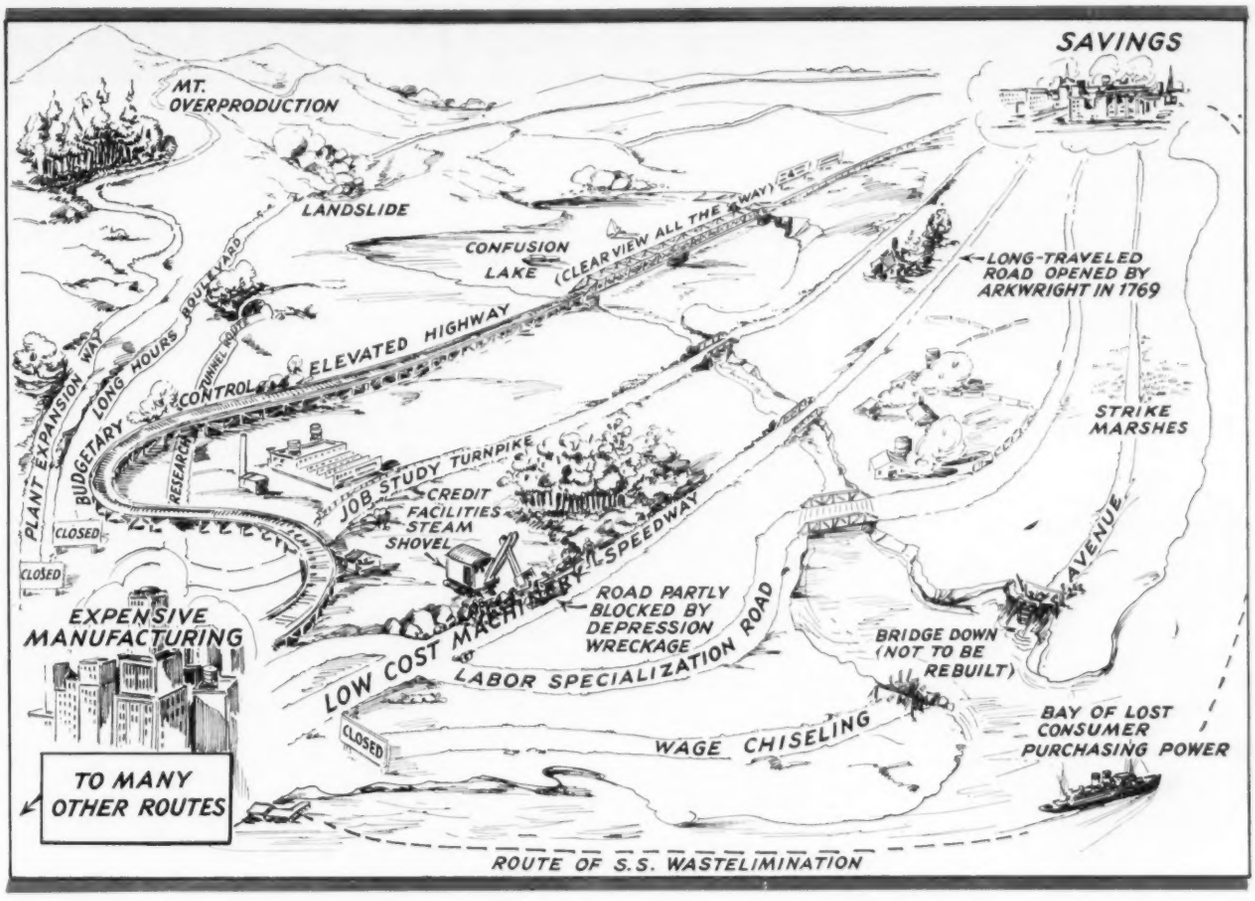
Impressive as this array of actually and potentially closed avenues to savings appears at first view, far more avenues are open and likely to remain open than are closed or likely to be closed. Instead of bemoaning the blockades, the thoughtful and progressive manufacturer will accept most of them as designed to be more beneficial than otherwise in the long run and turn his attention to making the earliest possible and most advantageous use of the many broad thoroughfares still open to him—thoroughfares which will be legitimately and safely traveled for a long time to come.

In the more than a century and a half that industry, as we know it, has been in existence, the greatest factor in cost reduction has been the installation of machinery more and more automatic in character and higher and higher in productive capacity. As this machinery has reduced costs and thereby increased the purchasing power of the consumer, demand for both old and new commodities has expanded, with the result that the workers displaced by the machines have been reemployed and our standard of living—the measure of our material civilization—has risen through successive generations. Because machinery development is so useful and important to society, it is inconceivable that government will establish or permit to be established any serious barriers to its continued progress. Already credit is being loosened for the purchase of improved equipment. The installation of automatic and high-production machinery is and will remain the most important avenue to reduced costs.

Second in importance is a great assembly of avenues and byways which may be called collectively "scientific management." The principles, purposes, and effects of scientific management are exactly the same as those of auotmatic, high-production machines, except that men, rather than machines, are the objects studied and improved. In fact, critics of the science assert that it is a medium for making machines out of men; but these critics overlook the fact that the relief of both mental and muscular strain, coupled with the shortened hours which high production makes possible, gives the worker more opportunity and renders him better fitted to indulge his mind in the more intellectual pursuits for which civilization has qualified it.

Scientific management involves the careful studying of a worker's job to see how it can be simplified and its production increased. It involves teaching a worker how he can use his hands and muscles most effectively and with the least fatigue. It involves arranging his material and equipment in a manner which will be most convenient to him. It involves the maintenance of working conditions—such as lighting and ventilation—most conducive to his efficiency. It involves assigning duties to those workers best qualified to handle them, separating a job into skilled and unskilled tasks so that the skilled worker's time will not be wasted (labor specialization, in other words), arranging machinery in a manner which will allow the material in process to flow through the plant with the least interruption and the least handling, and so on.

There are numerous practical considerations which are important to the textile mill of today. Unless one or more members of the mill organization are acquainted with and experienced in the principles of scientific management, the company will do well to enlist the services of some outside management engineer or engineers (we used to call them "efficiency engineers") to renovate its manufacturing methods. Scientific management is today



truly a science, and mere common sense cannot attain the required results. While it is true that a number of mills have in the past had unfortunate experiences in employing incapable management engineers, the fact remains that there are engineers who know what they are doing, are experienced in textile-mill problems, and have excellent records in the textile field. The management should make certain in advance that any engineer it hires has, among other things, a good understanding of psychology, because no matter how good his proposals, they will prove of little avail without the cooperation of the mill executives and workers.

Other avenues to savings which we have not mentioned and which are related to or are a part of the scientific management group, are also open. Maintenance of an efficient planning or control department will keep manufacturing departments balanced and avoid tie-ups in the filling of miscellaneous orders. Production and inventories must be budgeted, and the budgets thus developed must be correlated with the sales budget. Budgetary cost control, best established by professional cost engineers, will keep costs in line and minimize obscure and unanticipated expenses.

Bonus offers will increase the earnestness and productivity of the help. Group incentives will foster cooperation among workers. Waste of stock in process, supplies, water, power, and other items can be uncovered by special campaigns and maintained at proper levels by education and a system of reminders. Wasteful purchases can be minimized by testing raw materials and supplies and by standardizing purchases on qualities which are neither too poor nor too good for the purposes intended.

Seconds can be reduced by careful supervision, worker identification, improved working conditions, and many special precautions—religiously guarding against oil leakage, for example. Returns can be reduced by establishing and maintaining standard specifications. Through associational cooperation such standards can be made acceptable to a wide range of purchasers to the end that the mill will receive less varied specifications, can simplify its manufacturing accordingly, and reduce its costs. Research and experimentation must be conducted faithfully and constantly on the ultimate product and the numerous factors which contribute to its quality.

Maintenance of equipment will cost less if an adequate inspection system is established and repairs made in advance of breakdowns. Cleaning and oiling should be put on a systematic basis. It is advisable to investigate carefully the question of making or buying replacement parts, since it is not uncommon to find, if charges are properly made, that it costs more to manufacture than to buy them. If the engineering department will pay particular attention to accident and fire hazards, it may be able to reduce insurance costs. This department should also examine carefully the relative costs of manufactured and purchased power. If it is using the latter, it should ascertain for certain that it has selected the most advantageous rate to which it is entitled.

Finally—the sales department. There is sometimes an opportunity to reduce selling costs by improving the quality of the product. When this is done, the improvement should be adequately publicized and convincing proof (preferably in the form of test data) offered. Market surveys should be made, preferably by marketing specialists; and on the basis of the facts uncovered in this way, salesmen's territories should be rearranged and advertising and promotion redirected. Salesmen should be thoroughly trained and offered attractive incentives. All selling volume and expenses should be as carefully budgeted as manufacturing volume and expenses.

COST BREAK-

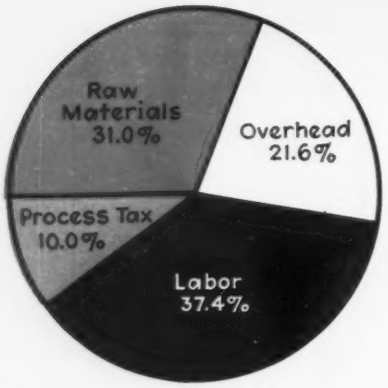
Shows percentage

◆ *One of the questions most frequently asked the editors is what the relationship is between the various items of cost in textile manufacture. Mr. Loper, by means of the accompanying "pie-charts," answers this question for certain representative yarns and fabrics, principally cotton. Below, he high-lights a few of the main deductions which may be drawn from this analysis.*

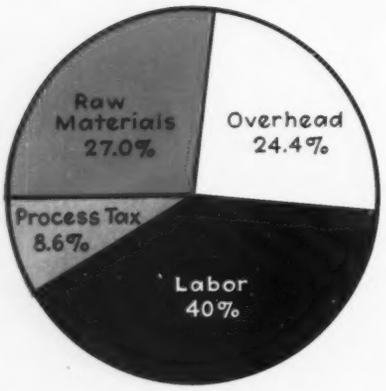
THE accompanying charts are based upon data from well-run, efficient mills. A comparison with similar data from your plant may bring out helpful suggestions. All elements of cost have been included with the exception of selling expense.

In many cases the cost in efficient mills exceeds the current selling prices so that percentages could not conveniently be based on the sales dollar. This conclusion is borne out by the data recently released by the Federal Trade Commission and based upon their study of reports from 765 textile plants. This study shows that in July and August, 1934, all the cotton mills lost at the rate of 3.64% per annum on the stockholders' equity. Similar results probably obtained during the last six months of 1934.

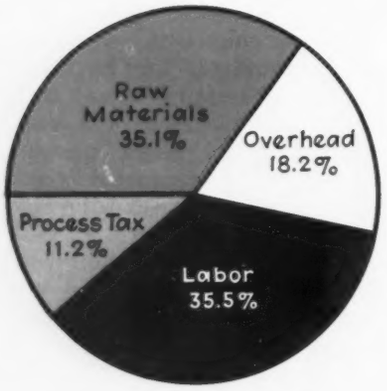
The importance of the processing tax is clearly brought out. On the cotton fabrics shown, the processing tax is from two to six times the amount of the depreciation and from four to ten times as great as the State, county and municipal taxes on the plant. See table



Voile



Lawn

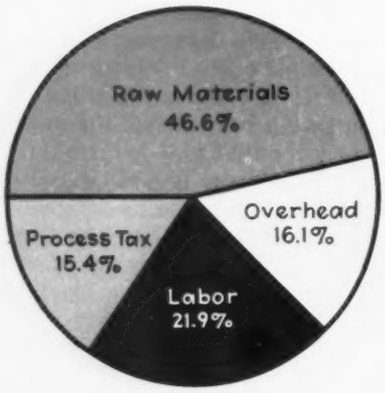


Broadcloth

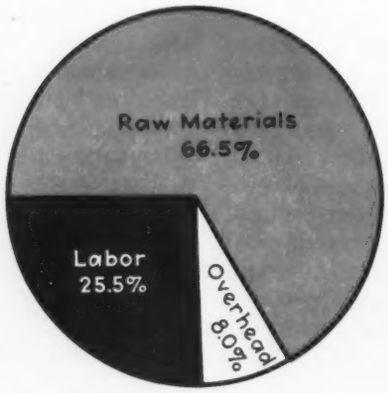
Percentages Various Items

Items of Cost	Voile	Lawn	Broad-cloth	Narrow Sheet-ing	Print Cloth	Filling Sateen
Supplies and Repairs	6.0%	6.5%	5.3%	5.1%	5.7%	4.7%
Power and Fuel	5.5	6.5	4.7	3.5	4.9	5.5
Taxes*	1.8	1.9	1.8	1.5	1.8	1.4
Depreciation	3.6	4.2	3.0	2.5	4.4	3.1
All Other Overhead†	4.7	5.3	3.4	3.5	3.6	3.0
Packing and Freight	.....	.....	.....	.....	.....	.....
Total Overhead	21.6%	24.4%	18.2%	16.1%	20.4%	17.7%
Labor	37.4	40.0	35.5	21.9	27.7	28.3
Raw Materials	31.0	27.0	35.1	46.6	39.4	41.7
Processing Tax	10.0	8.6	11.2	15.4	12.5	12.3
Totals	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

*Exclusive of income and processing. †Including salaries.



Narrow Sheeting



All-Rayon Twill

Sand Crepe

DOWN *relationships of major items*

By Ralph E. Loper

R. E. Loper Co., Fall River, Mass., and Greenville, S. C.

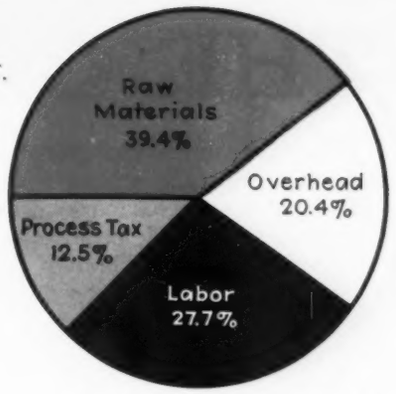
below for subdivision of overhead; only total overhead is shown in the charts. On the yarns shown the processing tax is from three to ten times the amount of depreciation and seven to fifteen times as great as the State, county and municipal taxes on the plant. In the case of coarse yarn counts, the processing tax exceeds the total payroll cost. In the case of 30/1 carded yarn and coarser counts, the processing tax exceeds the total cost for all overhead, including supplies, repairs, power, fuel, property taxes, depreciation, salaries, packing materials and freight.

These charts also show the importance of waste. The amounts of the processing tax and the material cost are both reduced by any saving in waste. Together these items amount to from 35 to 46% of total cost of fine goods and to over 68% of cost of coarse yarns.

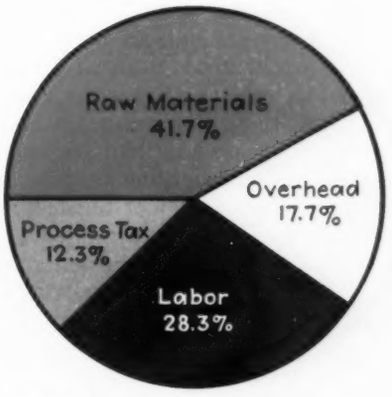
Occasionally one still finds a textile mill which in estimating the cost adds a percentage to the labor cost to cover overhead. The serious error which this method can introduce is shown by the changing ratio between overhead and labor which obtains when overhead has been properly distributed. Among the cotton fabrics shown the correct ratio of overhead to labor varies from 50 to 73%, and in the case of all-rayon fabrics goes as low as 26%. Among the yarns shown the ratio of overhead to labor varies from 75 to over 100%, again showing the importance of correctly distributing overhead in determining costs.

of Cost are of Total Cost

Alpaca	All Rayon Twill	Sand Crepe	10/1K Hos. Yarn	30/1K Warp Yarn	60/1C Warp Yarn	Items of Cost
4.3%	3.5%	2.9%	1.7%	3.4%	5.2%	Supplies and Repairs
3.0	1.3	1.5	2.4	3.3	4.8	Power and Fuel
1.8	.8	.9	1.1	1.0	1.7	Taxes*
1.7	.8	.8	1.7	2.3	3.6	Depreciation
3.7	1.6	1.9	3.0	2.3	3.8	All Other Overhead†
.....	.....	.....	5.7	3.3	1.9	Packing and Freight
14.5%	8.0%	8.0%	15.6%	15.6%	21.0%	Total Overhead
32.6	25.5	30.4	15.4	20.4	28.0	Labor
50.5	66.5	61.6	51.7	48.3	38.8	Raw Materials
2.4	.....	.....	17.3	15.7	12.2	Processing Tax
100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	Totals

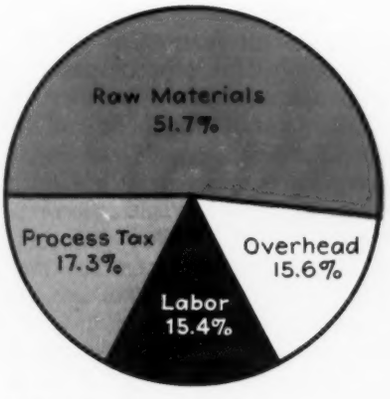


Print Cloth •

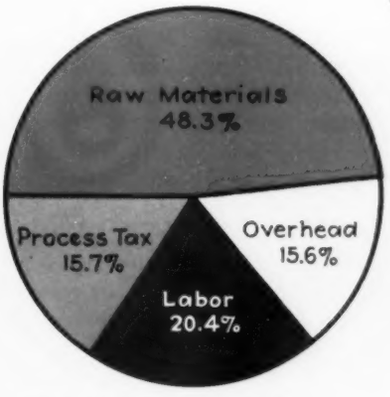


Filling Sateen

Alpaca



10/1 K. Hosiery Yarn



30/1 K. Warp Yarn

60/1 C. Warp Yarn

THE CONSUMER ASKS

What a product really is

THE consumer wants to know. That is the basic fact supplying the driving force to two parallel trends in textile merchandising, namely, the setting up of standards to cover descriptive labeling and the increased use of privately-owned brands. Too often the pajamas the salesman said wouldn't shrink have come back from the laundry looking as though they had been purchased for Junior. Too often the "pure silk" dress has come back from the cleaners limp and discouraged looking. The consumer is a little tired of it all, and rapidly increasing numbers are looking for a label or brand they can trust.

It is one thing to place a label on a product and it is something else again to have that label mean anything. The misuse of various terms indicating that a fabric has been preshrunk is too well known to be elaborated upon. Another case in point is the findings of tests made at the University of Cincinnati. Of 17 garments labeled "100% Pure Silk" no less than 16 contained both water-soluble and metallic weighting ranging from 31% to 57%. The one garment that met the test was also marked "100% Pure Dye." Obviously whoever placed the "100% Pure Silk" labels on the garments meant that the garments did not contain any cotton or rayon, but equally obviously the consumer was not aware of the technicality involved. "100% Pure Dye" means just nothing to the consumer.

If the consumer demands a label or brand that can be trusted, the situation can be met by the branch of the industry involved setting up and enforcing certain standards, or an individual concern, by honest dealing, can so build up the reputation of its brand that the consumer accepts it as a mark of quality. Both plans have been pushed within the last year. As an indication that various groups are well aware of the need for accurate labeling, here is a partial list of what is now going on:

1. National Federation of Textiles, Inc., has been working to develop simple identification terms for silk, rayon and mixed fabrics.

2. The International Silk Guild, fiber promotion body, is urging use of two labels, marked "All Pure Silk" or "Pure Silk Weighted," thus obviating any possibility of misunderstanding.

3. Underwear Institute has promulgated various standards, worked out by the industry and the U. S. Bureau of Standards, and is at work on others.

4. National Association of Hosiery Manufacturers has drawn up detailed specifications covering grades of hosiery and industry acceptance is expected.

5. Standards covering shrinkage, as well as methods for testing, may have been adopted before March 1.

6. Several converters are using labels stating that the fabrics have met shrinkage and fastness tests of the Laundryowners National Association.

Each advance in textile art brings with it an increased need for labeling—and honest labeling. Before preshrinking processes were developed everyone took it for granted that a fabric would shrink. Once preshrunk fabrics appeared there was need for a label to distinguish such fabrics from unshrunk material, and need for some means to have the label really mean what it said. When wool prices were rather high last spring there was a brief spurt in cotton-worsteds. Some of these mixes were made with such skill that not one consumer in a hundred could tell them from an all-wool fabric. In all honesty, however, such material should be identified by label, or

by lack of an "All Wool" label. The advent of rayon brought with the need for some means of differentiation from silk. Each step in progress makes the problem more acute. Unfortunately, some men progress in the direction of being fiendishly clever in devising ways and means to cheat the consumer, and labeling seems to be the most effective weapon to use against such chiselers.

With individual concerns, the need for some means to identify a product has led to an increased use of brands, particularly the application of a brand, well known in one field, to another line. Pepperell Mfg. Co., for example, starting off with a brand name for sheets, is continually applying the "Pepperell" name to new lines. "Pepperell Printed Seersuckers" is the latest addition to a series that includes prints, broadcloth, flannel, sheetings, crib blankets, and many others. Cannon Mills Co. is another concern that has extended its brand use, and the Kendall Co. recently decided to mark with a "K" all products not previously identified.

In rayon, the plan seems to be to carry the identity of the yarn through to the ultimate consumer even more forcibly than in the past, and to this end consumer advertising is being jacked up. The increased popularity of acetate, and the fact that there is no accepted generic term, such as rayon, for this type of synthetic yarn, has led producers to feature brand names exclusively. Plans for control of the quality of products made from the yarn are devised, of course, to protect the consumer.

While the whole problem of labeling and branding is undoubtedly the most important feature of the last year, there are a certain number of other aspects of the merchandising picture worth mention. One of these is the curious shift in demand for certain fibers. Thus cotton neckties come out at 8 for $1 and business in silk ties is badly hit during the summer months. Cotton slacks and summer suitings cut into the production of wool fabrics. Women become disgusted with the way some rayon underwear is weighted and stretched, and turn to cotton. Then comes a cold winter like last one and underwear with a wool content is in demand.

Another highlight of last year was the improved quality of the consumer advertising put out by textile concerns. It is not necessary to go back very many years to see the long strides made in the art of appealing to the public. The consumer wants to know and he or she is being told, through advertising, branding, and labeling.

FOREIGN TRADE

Shrinks as nations build up own textile industries

INDIVIDUAL countries have been striving, and will continue to strive, to place themselves in a position where they will not be dependent upon textile imports. That means simply that in the long run foreign trade in textiles will steadily diminish.

Such gloomy speculations are of little value unless they throw some light upon the present situation. A glance at the accompanying tables will illustrate how the long-range tendencies are at work. In 1923, we had a favorable balance of exports over imports of cotton cloth of 245,550,000 sq.yd. In 1934, despite the fact that our exports were less than half what they were in 1923, and actually less than the net balance for that year, the favorable balance dropped only to 188,119,000 sq.yd. In 1923, our favorable balance of exports over imports of cotton yarn was 6,812,000 lb. In 1934, despite a drastic reduction in exports, the balance dropped only to 5,965,000 lb. In 1923, we imported 11,400,000 lb. of wool cloth and 266,000,000 lb. of raw wool (exclusive of carpet wool). In 1934, we imported only 2,618,000 lb. of cloth and 23,584,000 lb. of raw wool. (Exports of both wool cloth and raw wool are negligible.)

Considering these two years, 1923 and 1934, it is obvious that what has happened is not that we have taken a terrific beating on the balance of trade, but that the total volume of foreign trade, going both ways, has been drying up. What hurts the textile industry, however, is that in the latter 1920s we were able for a time to boost our exports (the peak of 564,000,000 sq.yd. of cotton cloth was reached in 1929) and, at the same time, through high tariffs, reduce our imports. That the industry may have difficulty in again reaching this position is indicated by the fact that textiles did not share in the general increase in foreign trade which took place in 1934. Of 38 products listed by the Chamber of Commerce of the U. S., giving exports in quantities for the first nine months of 1934, only four showed declines as compared with 1933. Aircraft engines made the worst showing with a decline of 61%, but cotton cloth was in second position with a drop of 31%, the other two commodity declines being small.

The textile industry is better organized today to carry on an export business than it was in 1929, the peak year, so the industry itself cannot be blamed for present conditions. Although textile imports have shown a rising tendency since 1932, the volume increase has not been alarming and, with the industry on the alert to secure protection under section 3 (e) of NIRA it is not probable that we will have devastating foreign competition in our home market. It is competition in foreign markets that makes the problem.

Much has been said and written about Japanese competition. It is unquestionably serious in our foreign markets and must be watched lest there be trouble in our domestic markets. Japan is efficient in production and, with our higher labor costs, we are not in a position to compete on an even basis. That brings the question of reciprocal trade agreements very much to the forefront.

There has been some fear that textiles might get a bad break in such agreements. Fortunately, so far at least, nothing has been put through that need concern the industry from the standpoint of lowering our tariff protection, although various matters, such as the proposed German deal, cause nightmares at times. Putting through trade agreements takes time and the difficulties are many. One Government official has remarked that "it is sad to relate that a surprisingly large number of countries have become almost self-sufficient or entirely so in the matter of textile production." The fight must be directed toward securing agreements that are not only not harmful, but definitely helpful.

Note: The bearing of the price of raw material, such as cotton, on exports is obvious, but not within the province of this article. It need only be said that there are various plans to reduce the cost of raw material to be used in exports, but that little may be expected in this direction in the near future at least.

IMPORTS

	1923	1926	1932	1933	1934 (Est.)
Cotton Cloth Sq. Yd.	218,970,000	60,680,000	28,221,000	40,129,000	40,552,000
Cotton Yarn Pounds	5,269,000	4,315,000	1,296,000	1,597,000	1,773,000
Wool Cloth Pounds	11,400,000	10,312,000	2,012,000	2,938,000	2,618,000
Raw Cotton 500 lb. Bales	374,730	362,786	104,078	146,088	144,537
Clothing & Combing Wool, Gross Pounds	266,000,000	181,000,000	15,775,000	43,782,000	23,584,000

EXPORTS

	1923	1926	1932	1933	1934 (Est.)
Cotton Cloth Sq. Yd.	464,520,000	513,300,000	375,446,000	302,042,000	228,641,000
Carded & Combed Yarn Pounds	12,081,000	12,132,000	15,512,000	11,981,000	7,738,000
Raw Cotton Bales	5,279,000	9,048,000	8,916,000	8,353,000	5,915,000

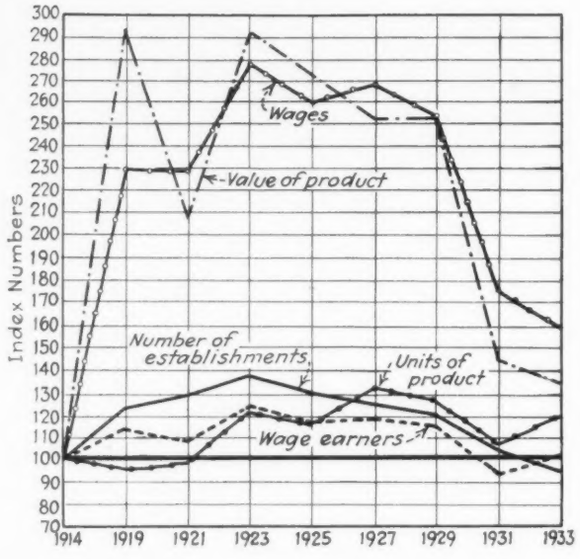
Textile Censuses Since 1914 Summarized

	1914	1919	1921	1923	1925	1927	1929	1931	1933
Establishments									
Cotton goods	1,179	1,288	1,328	1,375	1,366	1,347	1,281	1,140	1,057
Woolen and worsted	799	852	814	851	832	759	724	621	568
Silk and rayon goods	902	1,369	1,565	1,598	1,659	1,648	1,491	1,211	1,087
Knit goods	1,622	2,050	2,078	2,323	1,987	1,869	1,888	1,706	1,574
Total	4,502	5,559	5,785	6,147	5,844	5,623	5,384	4,678	4,286
Wage earners									
Cotton goods	379,366	430,966	412,058	471,503	445,184	467,596	424,916	329,962	378,828
Woolen and worsted	158,692	166,787	162,364	194,552	165,224	154,361	146,959	119,537	129,199
Silk and rayon goods	108,170	126,782	121,378	125,234	132,509	127,643	130,467	109,225	110,322
Knit goods	150,520	172,572	161,880	194,244	186,668	90,283	208,488	178,011	185,699
Total	796,748	897,107	857,680	985,533	929,585	939,883	910,830	736,735	804,048
Wages									
Cotton goods	$146,129,628	$355,474,937	$328,226,744	$396,602,644	$353,882,870	$380,909,543	$324,289,094	$219,680,268	$217,800,242
Woolen and worsted	75,953,444	168,108,681	174,894,768	222,984,522	191,270,791	173,821,905	164,151,331	117,493,102	101,364,144
Silk and rayon goods	47,108,469	108,226,330	113,395,626	126,849,454	142,733,539	140,053,588	137,547,146	97,409,008	74,098,215
Knit goods	59,758,151	125,199,820	132,190,349	168,271,584	168,682,840	188,163,458	210,714,335	149,589,312	128,763,580
Total	$328,949,692	$757,009,768	$748,707,487	$914,708,204	$856,570,040	$882,948,494	$836,701,906	$584,171,690	$522,026,181
Value of Products									
Cotton goods	$676,569,115	$2,125,272,193	$1,278,220,831	$1,901,125,703	$1,714,367,787	$1,567,400,612	$1,524,177,087	$805,792,347	$861,170,352
Woolen and worsted	379,474,379	1,065,434,072	755,583,768	1,062,558,438	957,790,338	817,978,299	827,006,348	496,242,138	457,879,992
Silk and rayon goods	254,011,257	688,469,523	583,418,756	761,322,119	808,979,399	750,123,705	731,200,231	422,771,960	290,577,662
Knit goods	258,912,903	713,139,689	634,073,895	848,176,734	809,960,213	816,620,494	899,716,672	585,677,382	498,310,008
Total	$1,568,967,654	$4,592,315,477	$3,251,297,250	$4,573,182,994	$4,291,097,737	$3,952,123,110	$3,982,100,338	$2,310,483,827	$2,107,938,014
Units of Product									
Cotton woven, sq.yd.	6,810,712,349	6,317,397,984	6,703,835,942	8,264,219,579	7,741,568,028	8,980,414,774	8,541,545,733	7,157,850,017	8,103,717,584
Wool, woven, sq.yd.	565,462,159	535,937,572	493,759,555	628,017,509	579,788,935	550,267,799	513,951,168	390,153,668	441,616,098
Silk and rayon, sq.yd.	216,033,696	310,132,060	278,411,105	376,221,689	483,115,974	512,826,739	597,113,792	566,864,129	558,880,768
Knit goods (in dozens):									
Hosiery	75,164,911	84,645,757	80,240,936	97,432,927	99,777,406	103,166,976	111,190,705	96,203,651	94,068,893
Shirts and drawers	21,758,775	17,180,404	11,711,624	12,746,531	11,261,521	8,492,497	8,801,924	7,958,780	10,220,923
Union suits	6,272,515	9,211,032	9,283,748	10,745,979	11,500,387	9,785,906	8,891,124	6,888,127	8,087,515
Sweaters	2,249,142	2,132,581	2,747,644	4,455,096	3,714,034	3,780,648	4,807,422	4,031,518	4,487,673
Total	7,697,653,547	7,276,637,390	7,579,990,554	9,393,839,310	8,930,726,285	10,168,735,339	9,786,301,868	8,229,949,890	9,221,079,454

CENSUS DROP CHECKED BY NEW DEAL

DURING the last few months of the period 1931-33, New Deal economics slowed the steep drop of every curve on the accompanying chart, and, in some instances, actually turned the curves upward, for the first time since 1927. Upturns took place in (1) wage earners and (2) units of product curves. The first, representing employment, surpassed the 1914 level, lacking only 12% of reaching the 1929 level. The second, representing production, increased 12% over 1931, the last census year. The fact that employment and production increased in exactly the same ratio, coupled with the fact that output per worker at the taking of this census was less than 19% greater than in 1914, might prove that there is not as much technological unemployment in the textile industry as some people like to think.

A complete picture of the industry during the last 19 tempestous years is shown in the accompanying chart, where vital facts from the Censuses of Manufactures have been plotted in relationship to 1914. In other words, using 1914 as a base, 100, the number of establishments, number of wage-earners, wages paid, value of products and total number of units of product in the four major branches of the industry during each of the succeeding census years have been reduced by TEXTILE WORLD to index numbers. The table above gives the details on which the chart was based.



IN THIS CHART, the index numbers for the various years are based on 1914 as 100. Totals of number of establishments, number of wage earners, wages paid, value of products, and number of units of product, are from the Census of Manufacturers; details are shown in table above. In the case of units of product the major items in the cotton goods, woolen and worsted goods, silk and rayon goods, ard knit goods industries have been totaled. Although in knit goods, number of dozen pieces has been used whereas in the other branches number of square yards is included, the totals are suitable for comparative purposes.

An interesting feature of the last period is that employment and production curves tend to converge with valuation and wage curves, the first time such a phenomenon has occurred during the years pictured herewith. This can probably be accounted for by the fact that while the New Deal "boom" arrived too late to offset months of low wages and rock bottom markets, it did arrive in time to boost employment and production curves appreciably. A further thought on this subject is that during the worst years of the depression, most mills produced a large quanity of unwanted goods in order to spread as much employment as possible among its people.

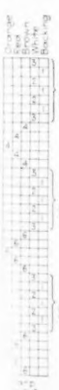
FABRICS OF 1935

A selection from the more promising cotton, wool, rayon, and silk samples

GLANCING over the group of samples gathered here—representative of some of the high quality fabrics likely to be important in 1935—leads one to a few conclusions regarding styles. Cottons are going to be exceptionally colorful. Wool fabrics will include many blistered effects of the matelassé and treebark variety; even the covert—fabric No. 8—may turn into a matelassé before the year is old, in which case it may lose some of the streaked appearance for which contrasting-twist-warp fabrics are notorious. Silks and rayons are going to exalt the piqué weave in one form or another; and they will also, although hardly in the same fabrics, do honor to the soft feel and easy drape.

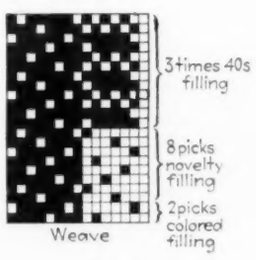
Terry fabric comes to the half hose this spring—in the line of more than one manufacturer—and the short sock with elastic top promises to continue its steady growth in acceptance. Knitted outerwear is, if anything, becoming more varied and more colorful.

As usual, we have had considerable help in selecting the samples and constructions contained in this survey, and we wish to acknowledge with gratitude the advice, samples, and constructions supplied by the following: Nos. 1 to 6, inclusive, Harry L. Robertshaw; 7 to 11, R. A. C. Scott, Noscotia Fabrics; 12, C. A. Lasky, Celanese Corp. of America; 13, W. H. Six, American Bemberg Corp.; 14, Fabric Development Dept., Du Pont Rayon Co.; 15, Robert Steer, North American Rayon Corp.; 16, Richard J. Frost, Allen-A Co.; 17, Holeproof Hosiery Co.; 18, Westminster, Ltd. (hose knitted by Nolde & Horst); 19, Phoenix Hosiery Co.; 20 to 23, Leslie Miner; 24 to 26, John Picone.

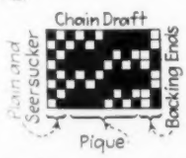


No. 2 FABRIC CONSTRUCTIONS

1. *Novelty Piqué Check*, a durable cotton fabric for sports wear. 38½", 124 x 80, novelty spiral yarn consisting of 1 end of 12s and 1 end of 30s twisted together, 40s color yarn, and 40s gray yarn in both warp and filling. Warp layout: 8 novelty, 1 gray, 4 color, 55 gray. Filling layout: See weave.

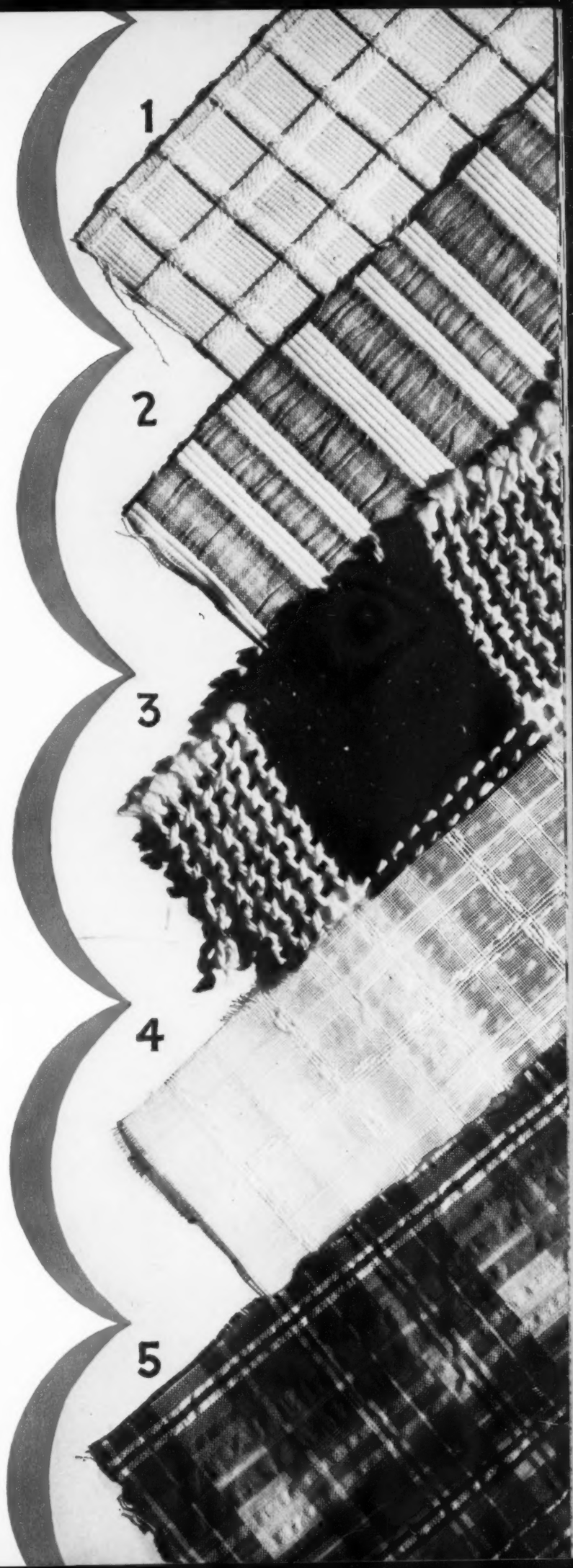


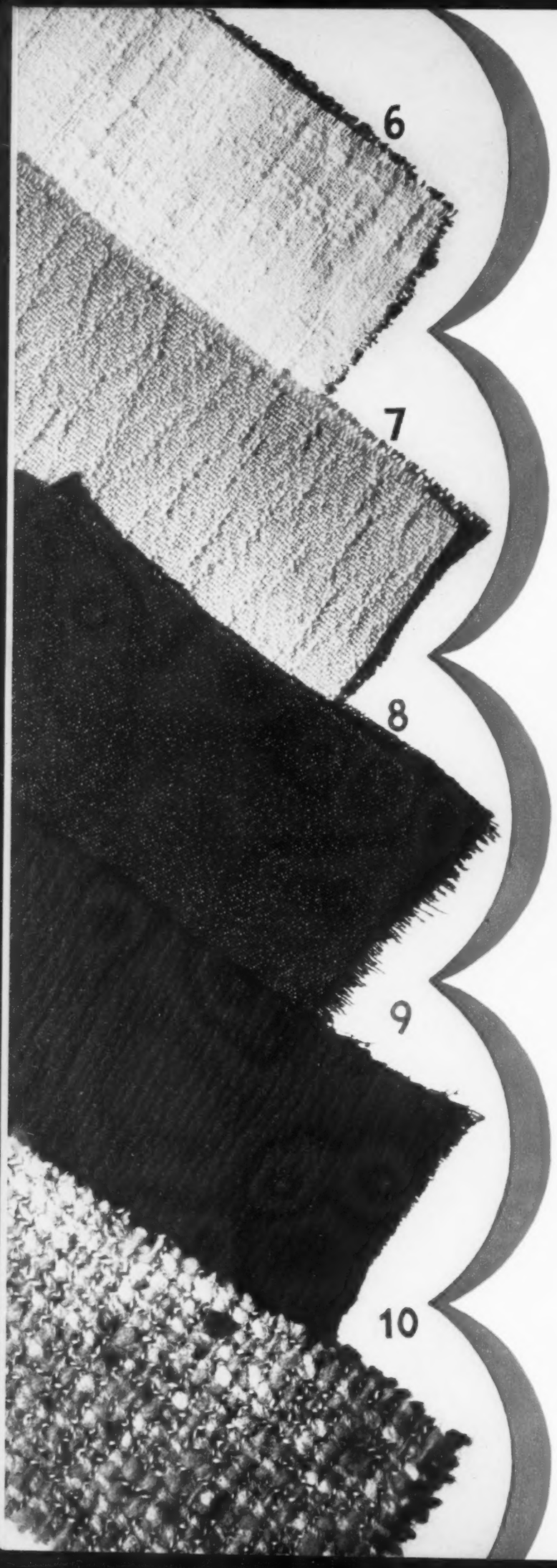
No. 1



2. *Yarn-dyed Seersucker Piqué.* Promises to be popular for afternoon dresses. 39", 112 x 112. Warp: 20s backing thread, 30s seersucker, and 30s ground laid out as shown. Filling: 40s.

Heavy Leno Mesh for sports wear. 56", 10 x 5. Warp: 2 [illegible] gray and color. Filling: Same. Warp pattern: 12 gold,

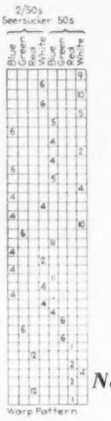




4 white, 20 blue, 4 white, 12 gold, 12 white, 4 red, 12 white. Filling pattern: 10 blue, 2 white, 6 gold, 6 white, 4 red, 6 white, 6 gold, 2 white. Weave: 1 x 1 leno.

4. *Fancy Seed Voile Check* for blouses and trimmings. 36", 64 x 60. Warp: 2/20s, seed yarn, and 50s voile, laid 4 seed yarn, 20 voile, 1 2/20s, 14 voile 2 ends as 1, 1 2/20s, 20 voile. Filling: Same, shot 20 voile, 5 voile beaten up in 1 shed, 12 voile 2 picks in 1 shed, 5 voile beaten up in 1 shed, 20 voile, 4 seed yarn.

5. *Plaid Seersucker.* Likely to be popular for dresses in an extremely colorful season. Note the irregularly spaced seersucker stripes. 37", 76 x 80. Warp: 50s gray and color and 2/50s seersucker, arranged as in accompanying warp layout. Filling: 50s gray and color, shot 38 white, 16 red, 4 white, 16 red, 18 green, 4 blue, 4 white, 4 blue, 4 white, 16 blue, 2 white, 16 blue, 6 green, 10 white, 4 blue, 4 white, 4 blue, 4 white, 16 blue, 2 white, 16 blue.
Weave: Plain.



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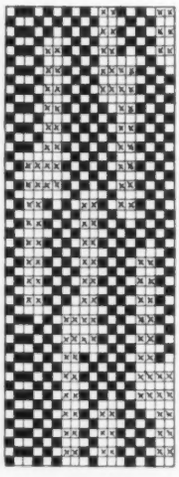
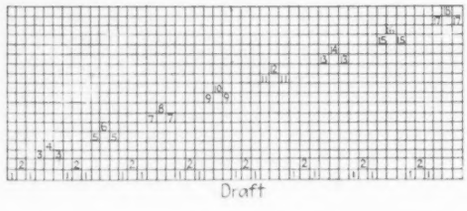


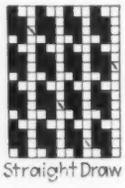
6. *Novelty Cotton Crepe* for summer dresses. 44", 40 x 38. Warp and filling: slub crepe averaging 15s drawn in, laid and shot 2 "Z" twist and 2 "S" twist. Weave: Momie.

7. *Worsted Suiting or Coating.* 14 reed, 3 ends in dent, 70" wide in loom, 30 picks, finished 11½/12 oz. and 54/56". Warp: 1/30s worsted "S" twist. Filling: 2 picks of 1/30s worsted "Z" hard twist twisted with 1/10s worsted "S" soft twist (2-ply "Z" twist 9 to 10 turns per inch); and 2 picks of 1/30s worsted "S" hard twist twisted with 1/10s worsted "Z" soft twist (2-ply "S" twist 9 to 10 turns per inch).

No. 7

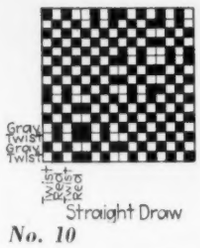


8. *Covert Suiting.* 22 reed, 3 ends in dent, 65" wide in loom, 48 picks, finished 9/9½ oz. and 54". Warp: 1/120s cotton twisted with 1/25s worsted (2-ply "S" twist about 15 turns per inch), 1/23s worsted resultant count. Filling: 1/20s worsted "S" twist hard crepe. Weave: 3-harness twill, filling flush. Finish: usual worsted, sheared fairly close on face, and piece dyed (acid).



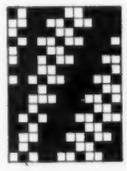
No. 9

9. *Worsted Matelassé Coating.* 24 reed, 3 ends in dent, 72" wide in loom (to allow for excessive shrinkage resulting from crepe filling and weave), 72 picks, finished 12/13 oz. and 54/56". Warp: 2 ends of 1/30s worsted "S" twist hard and 1 end of 4-run woolen "S" twist soft. Filling: 1/25s worsted "Z" twist very hard. Weave: Solid, as shown. Finish: Serviced only, piece dyed, sheared close on face and topped on back.



No. 10

10. *Novelty Woolen Coating.* 5½ reed, 2 ends in dent, 68″ wide in loom, 12 picks, finished 13 oz. and 54/56″. Warp and filling: 4-run white woolen twisted with 4-run black woolen "S" twist 11/12 turns. Warp only: ¾-run rough, nubby, soft, red-colored yarn. Filling only: ¾-run rough, soft-spun, light-gray yarn with large black nubs. Warp pattern: 1 end 4/4 twist, 1 end red. Filling pattern: 1 pick 4/4 twist and 1 pick gray. Finish: Scour finish only, using a penetrant solution which not only cleans quickly but also imparts a bloom to the colors in the mixtures.



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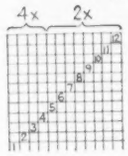
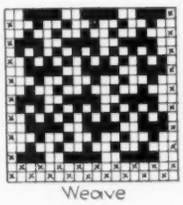




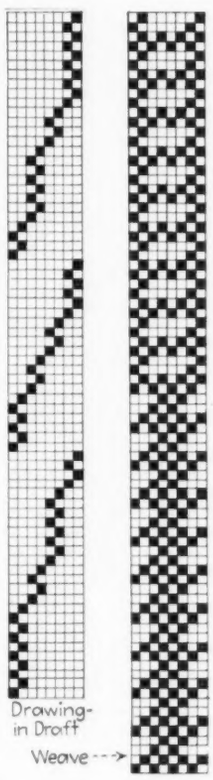
No. 12

11. *Woolen Dress Coating,* known as "Bark Polo." 8 reed, 4 ends in dent, 70″ wide in loom, 28 picks, finished 14 oz. and 56″. Warp and filling: 2½-run woolen. Finish: Fulled about 30 min. and scoured. After dyeing, given 2 to 4 runs on napper, face only, dried, and sheared to uniform level to give velour type of finish. Stock: Short and of good felting quality to allow fairly dense cover. In heavier weight with weave variations, suitable for fall.

12. *Acetate Armure* with hairline check. Warp: Set 41½″ in reed, 48/2 reed, 3488 ends of 150-den. 60-fil. 5-turn dull acetate and 436 ends of 150-den. 40-fil. 5-turn spun black acetate (total ends, 3924.) Edges: 48/2 reed, 30 ends (each side) of 2-ply 75-den. acetate organ. 10/10 turns. Filling: Same yarns as warp, 76 picks. The spun black acetate is a new yarn fast to boil-off and bleach. In the accompanying weave diagram solid squares indicate white warp yarn and crosses indicate black. "Having no shrinkage in washing," reports C. A. Lasky, "this is an ideal washable fabric for active or spectator spring and summer sports wear." He adds that it is wrinkle-resisting and has a smooth flowing drape.

13. *Triple Sheer.* Loom construction: 100 x 72. Warp: Set 46½″ in reed to finish 39″, reeded 50/2/1, 75-den. 60-fil. cuprammonium crepe, 2 "S" and 2 "Z." Filling: 75-den. 104-fil. cuprammonium, no twist. W. H. Six calls particular attention to the new fineness of filament in the filling yarn.

14. *Striped Rayon Crepe.* Loom construction: 160 x 48. Warp arranged for green, white, and black stripes of varied widths using following yarns: 100-den. 60-fil. 4-turn rayon, 100 den. 40-fil. 4-turn bright indanthrene-black acetate, and 100-den. 32-fil. 4-turn bright acetate. Reed, 45. Filling: 200-den. 120-fil. 45/50-turn



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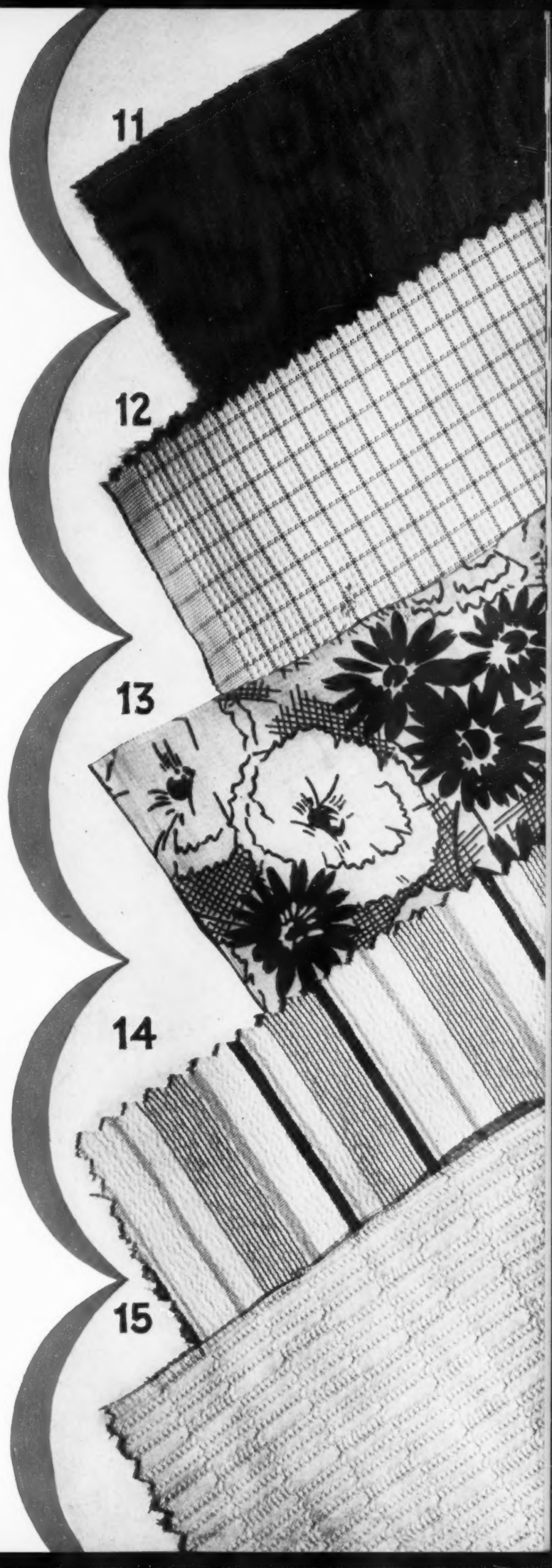

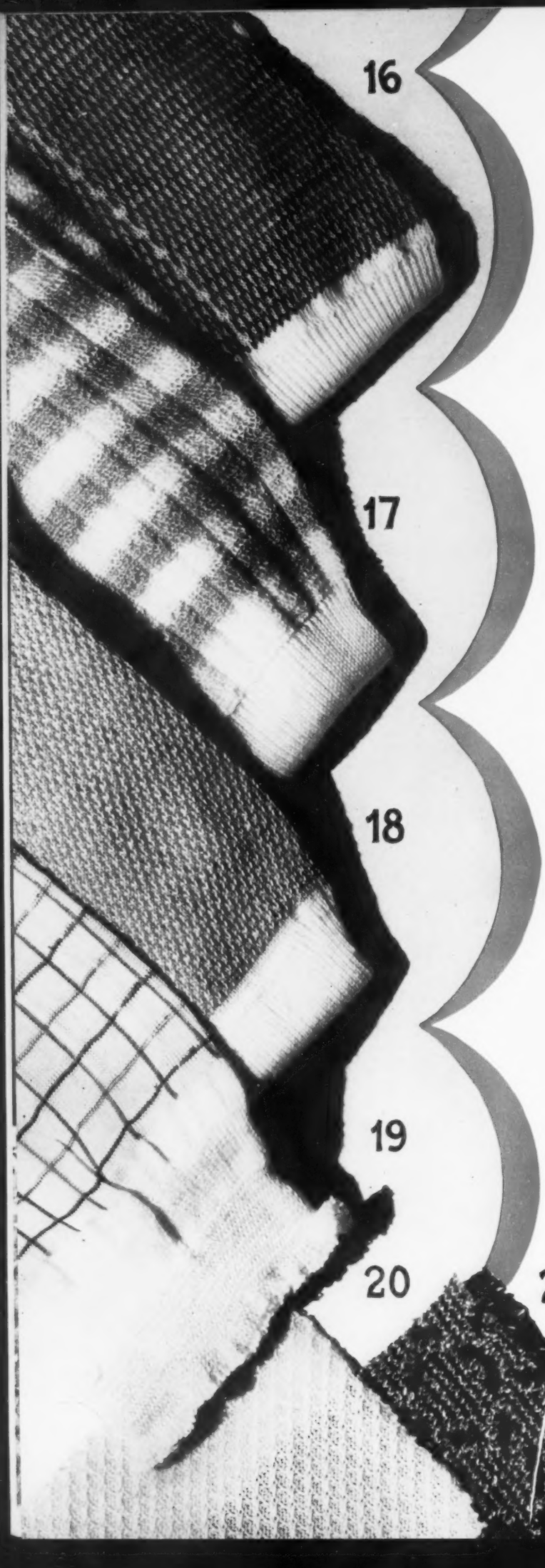

low-luster rayon, 2 "S" and 2 "Z." Finished width, 39½". Yarn dyed and cross dyed.

15. *Cord Piqué,* for sports and general daytime wear. Loom construction: 144 x 76. Warp: 48" in reed, 100-den. 60-fil. 5-turn extra-dull-luster rayon. Filling: 100-den. 60-fil. 48/50-turn "S" twist low-luster rayon in box 1, the same with "Z" twist in box 3, and 100-den. 60-fil. 5-turn extra dull luster in box 2. Order of boxes, 2 picks each: 1, 2, 3, 2. Gray width, 47". Finished width, 39".

16. *"Shell-Stitch" Half-Hose,* for wear with white sport shoes and light suitings. Ingrain, 60/2 mercerized lisle and 100-den. rayon, reinforced mercerized heels, soles, and toes. Knitted on 220-needle Standard Trump machine. Retails at 35c.

17. *Terry-Cloth Half Hose,* with ribbed effect. The long loops are produced by the sinkers pushing an abnormal amount of yarn to what would normally be the inside of the hose. Actually, therefore, the hosiery is worn inside out.

18. *"Grenadine" Half Hose.* Open texture of cotton for summer wear. It is called grenadine, we are told, "because that is what it looks like."

19. *Short Half Hose,* with Lastex top. Rayon mixed construction. Retails at 50c.

20. *Knitted Dress Fabric,* for spring and summer. Also suitable for gloves to match the dresses and for summer suits. Produced on 20" cylinder, 28-gage, spring-needle machine. Yarn on face, 2/45 mercerized. Yarn on plush, 4 ends of 150-den. rayon.

21. *Knitted Fabric for Suits, Dresses, and Coats,* fall and winter wear. Made on 24" cylinder, 18-gage, spring-needle machine. Yarns, 1/28s worsted of maroon color alternating with 1/28s worsted of maroon color over which has been twisted a white 150-den. rayon.

22. *Knitted Outerwear,* for fall, winter, and spring dresses. Made on 24" cylinder, 18-gage, spring-needle machine. Yarns: 2 ends of 1/28s worsted on 3 pattern feeds and 1/28s loosely covered with 150-den. rayon on 1 plain feed.

23. *Knitted Fabric for Blouses,* also suitable for light sweaters and pullovers. Made on 24" cylinder, 18-gage spring-needle machine. Yarns: 1 end of 1/30s combed peeler and 1 end of 1/16s combed peeler on each feed.

24. *Light Silk Crepe.* No sample shown. Warp: 43" in reed, 50 reed, 3/2 per dent, 12,900/1 or 6450/2 of 20/22 Japan, edges reeded 24/2/2. Filling: 60 picks per inch of 2-thread 20/22 Japan, 55/60 turns, 2 "S" and 2 "Z."

25. *Wide Silk Crepe.* No sample shown. Warp: 64" in reed, 55 reed, 3/2 per dent, 10,450/2 or 20,900/1 of 20/22 Japan, edges reeded 36/2/2. Filling: 80 picks per inch of 2-thread 20/22 Japan, 50/55 turns, 2 "S" and 2 "Z."

26. *Heavy French Crepe.* No sample shown. Warp: 42" in reed, 60 reed, 3/2 per dent, 360 ends per inch, 15,120/1 or 7,560/2 of Japan crepe, edges reeded 36/2/2. Filling: 104 picks per inch of 2-thread 20/22 Japan twist, 45/50 turns, 2 "S" and 2 "Z."

COTTON

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"MOST IMPORTANT..."

Cotton industry's greatest need for 1935

Concentrate on Merchandising

In my humble opinion, the most important single thing the cotton textile industry should do in 1935 is to concentrate greater and more effective attention on merchandising policies. This will call for:

1. Continued efforts of the industry *with the support of NRA* to secure a better balanced relationship of production with demand. If the industry is to be on a sound economic basis and do its part toward recovery, the destructive effects on sound competition of the threat of overproduction must be prevented;

2. Constant avoidance of surplus inventory and sales below cost; and

3. Protection of such export markets as we have left and a never-relaxing determination to regain old ones.

Geo. A. Sloan, *chairman, The Cotton-Textile Code Authority, New York.*

Needs More Good Merchants

I think the most important problem confronting the cotton textile industry for 1935 is to improve its merchandising.

Every business succeeds or fails as the merchandising end of that business does a good job or a poor job.

The textile industry needs more good salesmen and good merchants, and fewer order takers.

Wm. D. Anderson, *president, American Cotton Manufacturers Association.*

Regulate Production

The most important thing the industry can do during the coming year is to adopt some concerted action plan to regulate production to the demand. Such a step carried out over a sufficient period of time will restore the industry to a profitable basis.

Ernest N. Hood, *president, National Association of Cotton Manufacturers.*

Adjust Production to Demand

Recognize that, within the boundaries of maximum hours and minimum wages imposed by Code No. 1, we must individually exercise self-control and sound judgment in adjusting production to demand, without waiting for the hand of authority to be raised and orders given to slow down; and that efforts to avoid slowing down, by buying one's way in and thus diverting the flow of well-established business from an efficient competitor, invariably result in retaliation and in reduced manufacturing margins, without achieving a permanent increase in volume.

H. L. Bailey, *president, Wellington Sears Co., Inc., New York.*

Adopt Budgetary Control

My chief suggestion for making 1935 more profitable to the cotton textile industry is as follows:

An aggressive campaign by the industry through its associations to promote more widespread adoption of modern principles of budgetary control involving closer relationship of inventories and production to sales.

Fessenden S. Blanchard, *Pacific Mills, New York, and former Deputy Administrator, NRA.*

Sacrifice Volume for Profit

The cotton textile industry should make up its mind to sacrifice some volume for profit. The time has come for a better realization, on the part of management, of the position of trusteeship it holds to those who have invested their money in its properties. Consequently mills should close down when prices are below cost rather than attempt to operate at a loss. One important means towards this end would be a provision whereby the Code Authority would be empowered to enforce reasonable curtailment programs, not to exceed 15%, promptly when the first symptoms of overproduction appear.

B. B. Gossett, *president, Chadwick-Hoskins Co., Charlotte, N. C.*

Abolish Night Work

The potential and actual production of our mills is far in excess of domestic requirements, and the one essential to improve conditions is curtailment, and the quickest, most direct and easiest way to accomplish curtailment would be through the abolition of night work by government mandate.

Floyd W. Jefferson, *Iselin-Jefferson Co., New York.*

Produce to Sell at Fair Price

My answer to your question can be brief: Produce no more merchandise than our markets can absorb at a fair price. However, without further elaboration it would be useless to make this response. Over-capacity, greatly increased by two-shift operations, must be corrected by the scrapping of obsolete equipment which, due to slow mechanical improvement, is still competitive. We must learn to collect and utilize statistics, control inventories, base prices on accurate costs, promote good labor relations, maintain high operating efficiency and cooperate honestly with one another.

H. Nelson Slater, *president, S. Slater & Sons, Inc., Webster, Mass., and former Deputy Administrator, NRA.*

Repeal Processing Tax

I don't believe that I can use all of the 50 words in making a specific suggestion covering the most important single thing which can be done in the textile industry during 1935 to make it more profitable. My suggestion would consist simply of the following four words: "Repeal the Processing Tax!"

Geo. R. Urquhart, *president, Manville Jenckes Corp., Manville, R. I.*

NOSE-DIVE

Taken by cotton-textile industry in year of trials

Uncertainty Clouds the Outlook

ANOTHER roller-coaster year—marred by curtailment, labor strife, and slow markets—fraught with general uncertainty—is perhaps the best way to describe the activities of the cotton-textile industry during 1934. Getting off to a fast start, the first dip in the track came early—necessity for curtailment, taking the form of a 25% shutdown during the summer months. About the time the usual seasonal upturn should have begun, U.T.W. dynamited the track and activities took a nose-dive. With the strike settled, operations returned to normal, but prices did not. Several weeks of dead markets, and harassed manufacturers began to gnash their teeth and talk gloomily of curtailment. Fortunately, however, before any positive action was taken, the long dormant market suddenly came to life, and the year ended as merrily as it had started out.

A study of the year's operations shows that monthly cotton consumption in the United States averaged better than 500,000 bales until June and July, during which months it dropped to around 360,000 bales because of the summer curtailment. Consumption hit a low of 296,000 bales in strike-torn September, but climbed sharply in October to reach 520,000 bales. Average monthly consumption for 1934 was 451,000 bales, 12.9% less than that of the previous year, but only 1.4% below the five-year average, 1930-34, inclusive.

Spindle activity by months was at an average of 88.5% of single shift capacity, as compared with 101.4% in 1933, a decrease of 12.9%. Except for 1932, activity was the lowest for any complete year in the last thirteen, the second six months seeing a decline of over 18% from the corresponding period of 1933. This was due in part, of course, to the strike, which caused activity in September to drop to 3,716,216,653 spindle hours. Incidentally, there were about 247,000 more spindles active this year than last, despite decrease in hourly activity.

Statistics on production, sales and stocks of cotton goods, for many years issued by the Association of Cotton Textile Merchants of New York, were discontinued in 1933. Therefore, comparison of cotton goods volume with reports of previous years is impossible, and it is hoped that publication of such trade statistics will be resumed. Such preliminary estimates of cotton cloth produced in the U. S. during 1934, as were available, showed approximately 1,000,000,000 sq.yd. less than 1933, a decrease of 12½ to 13%. As to the export situation, interested parties set up a tremendous howl that the U. S. is rapidly losing its foreign trade, and from figures issued by the Bureau of Foreign and Domestic Commerce, such seems to be the case. For example, during the first ten months of 1934, the U. S. shipped about 37,000,000 sq.met. piece goods to the Philippine Islands as against Japan's 47,000,000 sq.met.; whereas, during the same period in 1933 the U. S. shipped 64,000,000 sq.met. against Japan's 17,000,000. Unofficial figures from Costa Rica show that in 1933 the U. S. sold approximately 65% of the cotton textiles imported by that country and that Japan sold 15%. In 1934 the figures were reversed—U. S. sales dropped to 19%, while Japan's increased to 59%.

At this writing, practically every cotton mill which has reported its figures for the fiscal year ending in 1934 shows a decrease in profits, or a net loss, or an increase in inventories—particularly those companies which reported after Sept. 30. Net working capital, generally speaking, was slightly above that at the close of 1933 fiscal periods, although some mills closed the year with an excess of current liabilities over current assets. Losses are said to be due to increased operating costs, processing taxes, and labor and legislative uncertainty. The Federal

HIGH-LIGHTS OF THE YEAR

Cotton

Curtailment plans carried forward. Most important: wide sheetings, 75% capacity 12 weeks beginning Jan. 29; carded yarns, 60% capacity 4 weeks beginning Jan. 29; fine goods, close three days each in February and March; combed yarn, 75% capacity 7 weeks starting Jan. 15.

Machine-hour limitation hotly debated at hearing in Washington where subsidiaries of Johnson & Johnson seek exemption. (April 2) (Exemption later denied.)

Cheerful meeting of American Cotton Manufacturers Assoication held at Charleston, S. C. Credit given NRA, but "digestive" period desired. (April 19)

National Cotton Week celebrated by 30,000 stores throughout country. (May 14-19)

Bankhead Cotton Bill signed. Calls for growers' allotments based on 1928-1932 period with tax of 50% of market value (but not less than 5c per lb.) on excess. (April 21)

Meetings held in Washington and U.T.W. agrees to call off threatened strike. With mills so quiet they would welcome shut-down, U.T.W. gesture becomes known as "McMahon's Folly." (June 1-2)

Curtailment plan goes into effect. With few exceptions, mills to operate not more than 75% of capacity for 12 weeks. (June 4)

"Under existing conditions, there is no factual or statistical basis for any increase in Cotton Textile Code rates," reports Leon Henderson, Division of Research and Planning, NRA. He favors equalization in higher brackets. (June)

Providence meeting astounded when George A. Sloan announces his resignation as president of Cotton-Textile Institute. (Aug. 3) (Mr. Sloan later persuaded to withdraw his resignation and to continue to end of year.)

Meeting of U.T.W. gives committee power to call general strike. (Aug. 13)

General strike starts. Flying squadrons—intimidation—riots—bloodshed. (Sept. 4)

Strike ends. Winant Board report says industry-wide agreement between U.T.W. and manufacturers not feasible. Textile Labor Relations Board set up. (Sept. 24)

Southern Textile Exposition, scheduled for Oct. 15-20, postponed until spring because of unsettled conditions.

A.C.M.A. holds meeting at Greenville, endorses George A. Sloan, protests processing tax and flying squadrons, wants no change in hours of labor or machine operation. (Oct. 17)

Annual meeting of N.A.C.M. in Boston elects Ernest N. Hood president for third term, adopts platform of industrial relations in conjunction with A.C.M.A. (Oct. 25)

Pacific Mills absorbs merchandising of M.C.D. Borden textiles. American Print Works to close. (Nov. 1)

Need for profits stressed at annual meeting of Cotton-Textile Institute. (Dec. 5)

Trade Commission report, covering investment, income and rate of turn of 409 cotton mills and finishing plants during the first eight months of 1934, showed that the mills had an income from Jan. 1 to June 30 of $14,870,-081 (before deducting interest and Federal income tax), a return of 3.72% on the investment, but during the two months prior to the strike, lost $2,859,678, or 2.17%.

Cotton Makes the Front Page

FOR nearly two years now, the cotton-textile industry has been the most highly publicized industry in the United States, if not in the entire world. Its claim to the nation's front pages started in 1933 with adoption of Code No. 1 and subsequent sensational expansion to 1929 levels of wages and employment. The point is that all of this unexpected "front page stuff" helped make the country more cotton conscious than ever before, and smart mill men are following up the free publicity with carefully planned merchandising programs. One company has even gone so far as to star cotton in a talking movie.

Something—could it have been the publicity?—caused over 30,000 stores last year to take part in National Cotton Week, an increase of several thousand over the preceding year. National Cotton Week, of course, is a brain child of the Cotton-Textile Institute, which has been doing an excellent job in promoting festivals, sponsoring style shows, issuing retail sales hints, etc., since its organization in 1926.

No longer are cotton garments considered suitable only to sleep in or to wear on a fishing trip; stylists and shrinking machinery have dissipated that illusion, if such ever existed. This clever pair has made cotton apparel as smart and serviceable as anything on the market, and public is showing appreciation with increased purchases.

A useful fad—crocheting and knitting—has taken a strong hold on American women. This trend has been a boon to many small spinning mills, which have come out of the red by developing yarns for that market.

Code No. 1 Still Inviolate

TODAY, the Cotton-Textile Code—Code No. 1—stands, with the exception of a few minor amendments, as inviolate as on the day of its adoption—a fitting tribute to the industry which sponsored it, and to those constructive minds which formulated it. Three definite results of the code noted during the last year, according to George A. Sloan, chairman of the Cotton-Textile Code Authority, were (1) relief of pressure toward minimum wages, (2) equalization of basic competitive conditions through the maximum work-week provisions which also substantially aided the employment situation, and (3) better balance between available capacity and demand effected by the limitation of machine operations to two 40-hr. shifts.

With regard to the last point—machine-hour limitation—the vast majority of manufacturers, led by Mr. Sloan, favored limitation as it stands, and did everything in their power to keep this section intact. Perhaps the strongest blow struck at limitation was aimed by Johnson & Johnson with a petition for exemption for its subsidiaries. It is now history that the petition was turned down cold. At this writing, several small specialty manufacturing companies are applying pressure for exemption on the plea that their business, largely seasonal, is greatly handicapped by the inflexible machine-hour provisions.

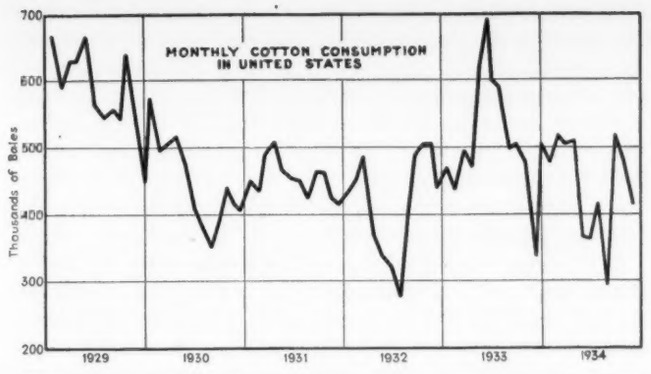
The Winant report, coming on the heels of the strike, caused quite a flurry in code circles. Less than a week after the board had made its recommendations to the President, he created by executive order a Textile Labor Relations Board, which automatically displaced the Cotton-Textile National Industrial Relations Board, better known as the Bruere board. He also authorized an investigation of hours, earnings and working conditions of employees by the Bureau of Labor Statistics, and an investigation of costs, profits and investments of textile companies by the Federal Trade Commission. A final recommendation called for appointment of a Textile

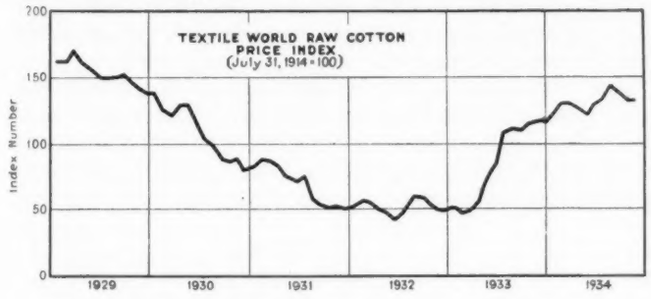
Cotton and Cotton Textile Prices and Activity

PRICES	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	1934 Monthly Average	1933 Monthly Average
Textile World Index Numbers:*														
Cotton	124	132	132	128	125	132	135	141	138	133	134	135	132.4	84
Yarns	151	148	149	144	136	136	148	150	148	141	136	136	143.6	116
Gray Goods	139	146	145	141	132	132	136	136	149	143	138	139	139.7	110
Colored Goods	144	144	142	141	140	140	140	140	144	140	140	140	141.2	113
KEY QUOTATIONS:**														
Spot Cotton (N. Y.)	11.75	12.20	12.15	10.75	11.80	12.10	13.20	13.15	12.50	12.25	12.75	12.85	12.28	8.81
10s Frame Spun Carded Yarn	27½c	30c	29c	26½c	26½c	27c	29½c	30c	28½c	27½c	27c	28c	28c	21½c
10/2 Carded Skeins	28	30	29	26½	26½	27	29½	30	28½	28	27½	27½	28	22¼
20/2 Carded Warps	31½	33½	32½	30	30	30½	33	33½	32	31	30	30½	31½	25
60/2 Combed Peeler Warps	59	63½	59½	58	58	58½	62	62½	61	57	55	58	59	53¼
60/2 Mercerized Cones	74	74	73	72½	70	69	73	73	73	70	70	70	72	67
37-in. 3-yd. Drill	9¾	10	9¾	9½	9½	9½	9¾	10	10½	9¾	9½	9¼	9¾	7⅞
38½-in. 64x60, 5.35 Print Cloth	7	7¼	6¾	6¾	6¾	6¾	6¾	7¼	7¼	6¾	6¾	6¾	6¾	5½
36-in. 4-yd., 56x60, Sheeting	7⅜	8⅛	8	7⅜	7⅜	7⅜	7⅜	7⅞	8⅛	7⅞	7⅜	7⅜	7⅜	6¼
Denims, 2.20	15½	16	16	15½	15½	15½	15½	15½	15½	15	15	15	15½	13

* Index numbers and fabric and yarn quotations since Aug. 1, 1933, include Processing Tax.
**End of month quotations.

ACTIVITY	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	1934 Monthly Average	1933 Monthly Average
Cotton Consumption (Running Bales)	508,034	477,890	543,690	512,703	519,765	363,414	359,372	420,949	295,960	520,310	477,060	413,500	451,000	517,605
Spindle Activity														
Activity Spindles (Thousands)	25,647	26,380	26,525	26,485	25,896	24,621	24,418	24,154	22,113	25,095	25,050	25,057	25,120	24,873.3
Active Spindle Hours (Millions)	6,973	6,692	7,706	7,259	7,268	5,241	5,152	5,753	3,716	7,185	6,703	6,027	5,804	7,217.2
Average Hours per Spindle in Place	225	216	249	234	234	169	167	186	120	233	217	195	203.7	233
Percent of Single Shift Capacity	98.5%	101.5%	102.7%	105.6%	98.0%	72.6%	74.3%	76.8%	54.3%	97.1%	94%	87.1%	88.5%	101.4%





Works Assignments Control Board to study the ever-present stretch-out problem.

Ardently, the Bureau of Labor Statistics and Federal Trade Commission went to work investigating "secrets" of manufacturer and employee alike. After considerable expenditure of time and money, both investigating parties reported facts which had been known all the time.

An interesting highlight of the year's end was the Sydney P. Munroe report on code violations released through George A. Sloan, chairman of the authority. Of 3,799 complaints investigated during the first six months of the code's existence, adjustments "satisfactory to employers and employees" were effected in all "except cases involving only 23 employees."

All associations were extremely active during the year, partly as a result of abnormal economic conditions and partly as a result of increased interest throughout the industry. Real service was rendered in disseminating code data and interpreting legislative problems. A feature of the year was the holding of closed meetings by the American Cotton Manufacturers Association and the National Association of Cotton Manufacturers, resulting in joint adoption of a "platform of principles of industrial relations." The industry lost a great leader when George A. Sloan resigned as president of the Cotton-Textile Institute, and, to date, no successor has been named. Goldthwaite H. Dorr is acting temporarily. A gain in membership of 4,959,137 spindles was reported, bringing the total to 25,234,000—the highest since the organization was formed in 1926.

Washington News Shapes Cotton

THE Washington news, of course, has been the dominating influence in the cotton market during the last year. There have, doubtless, been contributing factors of a more familiar character, but, in main, price movements have been traceable directly or indirectly to the development of the Administration's monetary and economic policies. Devaluation of the dollar; nationalization of silver; crop control measures both voluntary and compulsory; processing taxes and crop loan policies, have all played their part, and the possibilities of further developments in these directions were fully occupying trade attention early in the year.

There were four major price movements during 1934, which began with cotton futures in the New York market selling at prices ranging from about 10 to 10½c. From that level there was a sharp advance stimulated by the signing of the gold bill creating the 59c. dollar, and by the middle of February, prices had gained in the neighborhood of 2½c. per lb. Technical readjustments then appeared to have been completed, and once the sentimental effect of devaluation had run its course, reactions were promoted by uncertainty as to the effectiveness of the acreage control program. After selling off about 2c. at the beginning of May, however, the market stiffened on reports of improving trade demand and indications that farmers were cooperating in the acreage reduction program. This advance was encouraged by a tightening spot situation and the development of droughty conditions in the Southwest during July. Prices reached the highest levels of the year early in August with a trading range from 13¾ to 14¼c. in the New York market. At this level the advance was checked by improving crop advices and the approach of the new crop movement. A sharp falling off in export demand combined with the textile labor troubles of September contributed to the decline and by Oct. 10 the market had lost nearly 2c. of its midsummer advance. As prices eased off to about the 12c. level, however, the stabilizing influences of the Government 12c. loan policy asserted itself and the market turned upward as supplies were withdrawn. March contracts closed the year at 12.70c., compared with 10.26c. at the close of 1933, a net advance of about 2½c.

The severe drop in foreign demand naturally aroused apprehensions that the South was threatened with a serious curtailment of its export outlets, should there be a continuance of production control and maintenance of prices above a normal parity with competitive growths abroad. No doubt, the dislocation of foreign exchange markets, combined with the fact that an unusually large amount of foreign-grown cotton had been carried over from the previous season, were contributing factors in this respect. Quite aside from these features, however, there was a feeling that the pegging of prices by the 12c. loan above their normal relation to competing growths had been largely responsible for substitution on a large scale and the sentimental effect was magnified by a tendency to increase estimates of the crops abroad, particularly in Brazil. For the first four months of this season exports were only 57.4% of last year's, but the active demand abroad during this period seemed to have cleaned up some of the more desirable competitive grades, and toward the end of the year, prices for outside growths showed a tendency to firm up in relation to American.

This trend was accompanied by a slight rise in foreign demand, and exports during December showed some improvement, amounting to 61.5% of last year's figures. More recently there have been reductions in estimates of the crops abroad, and while the threat of increased competition for American cotton remains to be reckoned with, there is a feeling in some quarters that exports for the balance of this season may be better sustained than usual during the last half of the trade year. Meanwhile, domestic consumption has been fairly well maintained since the settlement of the textile labor troubles last September with a particularly active business during December attributed to increased buying power, particularly in agricultural sections, which had benefited by the large

Government expenditures in rental and benefit payments out of processing taxes. These conditions and the apparent increase in general business activity during the last quarter of 1934 created a more hopeful feeling as to the outlook for domestic consumption.

The statistical position of American and foreign growths of cotton in the world's markets at the beginning of January based on such reports as have recently become available through the New York Cotton Exchange Service, appears to be about as follows:

	American		Foreign		Totals	
	1934–35	1933–34	1934–35	1933–34	1934–35	1933–34
Carryover	10,746	11,754	5,535	4,501	16,281	16,255
Crop*	9,666	12,712	12,165	12,615	21,831	25,327
Supply	20,412	24,466	17,700	17,116	38,112	41,582
4 mos. cons	3,912	4,857	4,229	3,643	8,141	8,500
Supply Dec. 1	16,500	19,609	13,471	13,473	29,971	33,082
8 mos. cons	–	8,863	–	7,938	–	16,801
Carryover		10,746		5,535		16,281

*Including city crop, etc.

Estimates of world's consumption of American cotton for the season range from about 11 to 12 million bales, and assuming that it will aggregate in the neighborhood of 11,750,000, which, of course, is pure guesswork, it would leave a carryover in this country on Aug. 1 of approximately 8,700,000 bales.

The trade is looking forward with much uncertainty as to the probable further development of the situation during 1935. According to the latest available reports from Washington the voluntary acreage adjustment program of the Administration for 1935 opens the way for a reduction of about 35% in the base acreage of participating growers, while a continuation of the Bankhead Compulsory Control Act is expected to aid the Department in securing the full cooperation of growers. The Bankhead quota announced in 1935 is 10,500,000 bales of 500 lb. net, or about 11,000,000 bales of 478 lb. net, compared with last season's quota of 10,460,000 bales. In addition to this quota, it is understood that between 300,000 and 400,000 bales of outstanding 1934 tax-exemption certificates may be utilized in 1935, bringing the total up to about 11,300,000 bales of cotton that may be ginned tax-free. Estimates of next season's acreage based on these programs range from about 28,000,000 to 30,500,000 acres, depending upon the percentage of cooperation. An acreage of 30,500,000 with a ten-year average yield of 177.1 lb. per acre would mean a crop of a little over 11,300,000 bales.

Early in the year, the market was awaiting the outcome of uncertainties in various directions, of which one of the most important was the Supreme Court decision on the gold clause cases. Even though this question has now been definitely settled; beyond that there is much conjecture as to whether or not there will be Government crop loans this year.

Important Spinning and Weaving Advances

LONG drafting must take first place in any review of technical developments during the last year, with new-model looms in second position. Long drafting in itself is nothing new; but three trends, each heading toward the common goal of cost reduction by one means or another, are evident at present. They are:

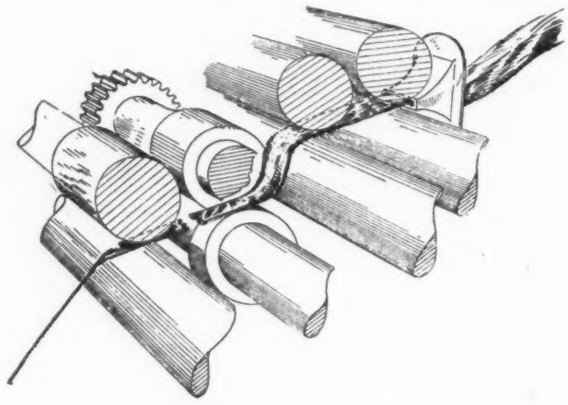
1. Development of spinning frames which spin directly from drawing sliver, the principal object being to reduce cost through elimination of all roving processes. However, installation is expensive and yarn quality unknown.

2. Further application of long-drafting to the roving processes, with the object of reducing the roving operations to one, and thus effecting improvement with relatively low installation costs.

3. Simplification of long-draft spinning devices to reduce cost of installation.

The frame for spinning direct from drawing sliver which makes use of drafting rolls mounted on revolving disks to put in and take out false twist has not been placed in commercial operation as yet. No specific data on the quality of the yarn produced have been published. It is reported that the principles on which this machine operates are applicable to single-process roving.

Another system for spinning from drawing sliver has been developed in Germany and improved (by a new system of roll weighting) in England. In this compound-draft frame there are two sets of drafting rollers in series. The first set are ordinary slubber rolls, and the



Long-draft roving by means of concentric ring and groove

second are of the apron, long-draft type. Between the two there is a revolving trumpet to insert false twist and hold the fibers together. Draft on the first set of rolls varies from 5 to 15; between the two sets, from 1.1 to 2.5; and on the second set, from 5 to 40. Total draft of from 27.5 to 2,700 is possible, with 50 to 400 commercial practice. Here again, little data on yarn quality are available in this country.

In roving, one system makes use of a "forming" trumpet to condense the stock, two sets of fluted rolls, another set of rolls in which a concentric tongue on the bottom roll fits into a concentric groove on the top roll, and an ordinary pair of front rolls. The purpose of the tongue-and-groove arrangement is to fold the selvages on the stock inward to counteract the tendency of the stock to spread. Drafts run from 10 to 30 on 1-in. cotton and, applied to the conventional roving frame, permit the spinning of the usual run of numbers from double roving.

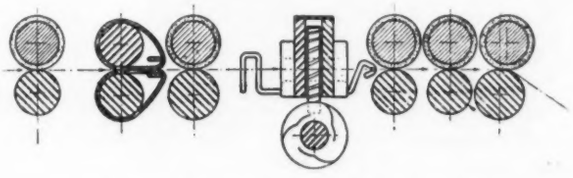
Another invention combines an apron-type, long-draft slubbing system with an ordinary roving operation to permit the spinning of yarns above 30s with only one process of roving. The fibers pass first through the three sets of long-draft slubbing rolls, then go through a revolving piece which inserts false twist, and finally through a line of regular roving rolls. Draft in the first series of rolls is from 7 to 10, between the two sets is 1.25, and in the final series is 5 to 6, permitting a total draft of from 42 to 75. It will be noted that this arrangement is similar to that of the German spinning

frame already referred to. The new roving frame supplements a single-process machine developed for the coarser counts two years ago.

Another development stresses the simplicity of installing the long-draft features. In this system the fluted bottom rolls are not changed, but an assembly is applied in place of the middle top roll, consisting of a fluted roll around which two loose leather belts are wrapped and a cradle designed to keep the roll and belts in position. The cradle is also integral with the back saddle. A weighted steel roller produces a positive break draft, and it is said that 60% of all fibers are held in control by the loose leather cots against the fluted bottom roll. Usual high drafts are possible and the system may also be applied to roving frames.

A relatively simple method of control is represented in the use of card clothing as a roll covering, thus permitting long drafting. This development really traces back to earlier efforts to groove the top roll concentrically, while keeping the bottom roll fluted in the usual manner. The use of card clothing represents a further refinement of the idea.

Going back to raw cotton, we find commercial use being made of the polarizing microscope for determining



Long-draft roving by means of aprons and twister head

the "character" of raw cotton, based upon the premise that the spinnability of a sample depends largely upon the degree of ripeness or maturity of the fibers. Another aid is a compact analyzer, evolved in England, for extracting dust and rubbish from raw cotton in 30 min., thus obviating the necessity for putting test samples through the entire range of opening and picking machinery.

Better methods of cleaning, blending, and distributing cotton, brought out in recent years, as well as air-recirculation in the picker room, have found increasing application. A new development is a cleaning and blending reserve, to be placed between the intermediate and finisher sections of one-process pickers. With this equipment in place, the finisher section operates independently of the breaker section, but the feed of the latter is controlled by a feeler and mercoid switch in the reserve chamber so that the cotton level in the reserve is kept within close limits to assure uniform delivery to the finisher. Better cleaning and more uniform laps are said to result.

To assure uniform weight of laps, despite atmospheric changes in the picker room, a new lap-weight indicator shows the operator what the lap should weigh under the actual conditions of relative humidity existing in the room. Thus, if the standard lap-weight is 40 lb. at 6½% regain, the indicator may show 39 lb. if the air is dry, or 41 lb. if it is damper than standard.

Among the improvements for the opening room is a re-designed lattice conveyor featuring a mouthpiece so designed that any heavy foreign material, such as pieces of band, etc., will drop out and not be carried along with the stock.

A double-sided comber has recently been developed. Uniform sliver, high production, low operating and maintenance costs, and economy in floor space are features. This type of comber, along with other models brought out in recent years, has placed older types in an extremely difficult position from a competitive standpoint.

Long-draft developments in roving and spinning have already been mentioned. Among supplementary spinning devices is a positive-action, fully automatic bunch builder which can vary the length and width of the bunch without change in cams. Other new products include cork cots with adhesive already applied to the inside to facilitate roll covering, and a roll clearer of sheepskin with the wool still in place. Coming to twisters, we find a new cone creel designed particularly for kinky yarn.

Positive control of stretch and further development of temperature- and moisture-control instruments feature slasher improvements. One device assures a positive, uniform feed-in to the size box; and, by means of change-gears, it is possible to obtain a pre-determined amount of stretch, or lack of stretch, in the yarn. The device also allows an increase in slasher speeds of 10 to 15 yd., provided the slasher itself is modern and has sufficient drying surface. A moisture-control instrument has been brought out that is designed to maintain automatically, within close limits, any pre-determined degree of moisture by means of heat and speed regulation. A new control system regulates the temperature of the size in the size kettle and the size box, the level of the size in the size box, and the temperature of the drying cylinders.

Three brand-new cotton looms made their bow in 1934, and two others would have been seen if the Southern Textile Exposition had not been postponed. The three shown were bobbin-changing looms and included a terry-towel loom, a head-motion loom, and a dobby.

The terry-towel loom features a 24-in. diameter beam, holding approximately 50% more yarn, an 8¾x1⅝-in. bobbin which holds three times the yardage of previous models, and a 22-in. diameter cloth roll which has a new take-up to keep the roll out of the alley and which holds about 75% greater yardage. The loom is designed to operate at "at least" 180 picks per minute. For the first time, a stop motion has been applied to the terry warp, the drop wires being supported automatically at the slack pick.

The head-motion loom also features the larger bobbin, beam, and take-up roll. It has been designed primarily for cotton pants-cloth, has sixteen harnesses, and will operate at 152 to 162 picks per minute. The dobby has similar features and is made with twenty harnesses. As it is designed for a variety of fine goods, speed depends upon conditions, but a considerable increase over older models is possible.

Among loom accessories are a new two-shift, resettable pick counter, a compression clamp which allows a pick-counter drive to be installed without drilling the loom shaft, a readily changed harness adjuster, and a selvage harness designed to produce better selvages.

For the cloth room, there is a new model of a seam-protecting shear for removing projecting threads from both surfaces of fabrics at a speed of 80 yd. per minute.

Miscellaneous cotton equipment brought out during the year includes: controlled regain cabinet for laboratories, permitting constant percentage of regain in samples; evenness tester for yarns; paper single-head thread spool; longer-wearing thread guides; and improved spools.

PRACTICAL HELPS for Cotton Overseers

METALLIC CARD clothing wrapped and brazed on the take-up roll is recommended as a filleting material. It does not pick cloth, does not rust, holds the cloth well, and does not require changing.

•

ON SOME LOOMS, rocker-shaft boxes are not doweled to the loom sides, and the bolts which hold them in place become loose. This allows one side of the lay to sag, and the loom throws the shuttle out.

•

IT HAS BEEN discovered that increasing the twist in warp yarn up to a constant of 5 brings about a considerable reduction in the number of end-breakages, despite the fact that the yarn strength as measured by the skein test is reduced.

•

IN OVERHAULING pickers, give special attention to cleaning out of the slow bearings, such as those at the screens, because the grease has a tendency to harden in the grooves and resist further pressure from the grease gun.

•

WHEN NEW shuttles are installed, it is a good idea to realign the shuttle boxes to make certain that they are parallel.

•

OVERLOADED motors and out-of-plumb spindles are often due to disalignment of machines.

•

TESTS ON long-draft spinning frames equipped with ball-bearing spindles showed the following advantages over plain-bearing spindles; 20% saving in power per pound of yarn; 1.5% increase in average production per spindle; 3 to 6% increase in breaking strength of yarn; and 23% decrease in number of ends down.

•

CARE SHOULD be taken in the plying of yarn for use in etamines, as any appreciable variation in turns per inch will result in a streaky fabric. Likewise, knots in the filling should be avoided, since they make large bunches.

•

ON CERTAIN types of twister frames it is sometimes impossible to get at the check-nuts without first moving the cylinders a sufficient distance apart to permit introduction of a wrench. When the cylinders have to be loosened and moved, a specially designed wrench with a T-type handle is invaluable.

•

THERE IS danger that too much oil will be applied to segments of eveners. Use only two or three drops of oil every six months; take out these parts and clean them once a year.

•

IT HAS BEEN suggested that if a motor is used for winding on card clothing, more even tension can be afforded than is possible with the hand-crank method now generally employed.

•

LIFE OF shuttles is lengthened if they are inspected once a month, any rough places polished off, a high-grade tallow applied to reduce wear, and the shuttles permitted to lie over the week-end after this treatment.

•

REMOVAL OF the middle roll of long-draft spinning equipment and use of an air blower facilitate cleaning. The steel rolls can be cleaned with a steel brush or hard waste; leather rolls, with a light brush.

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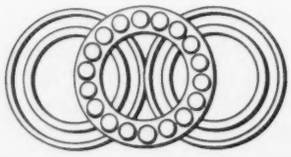


SUBSTITUTION of ball-thrust bearings for the friction bearing on loom motors enabled one mill to reduce weave-room power costs $1,665 per year. This repaid the investment of $450 for ball thrusts in less than four months.

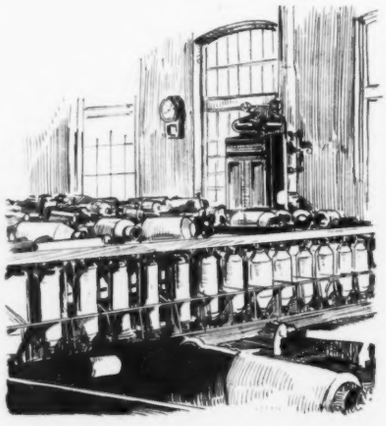
•

CONTRARY to usual custom in this country, several mills are now blending after cleaning instead of before. Evener and cleaner laps are the result.

•

ON ONE-PROCESS pickers, keep the hopper full at all times to avoid uneven laps.

•



ALWAYS REMEMBER that the disadvantages of short doffing outweigh any possible advantages. This applies to cards, drawing frames, fly frames, and speeders, as well as to spinning frames.

•

TO ESTIMATE the number of pounds of yarn that can be wound on a loom beam, multiply the available yarn space in cubic inches on the beam by 0.02. The available yarn space is found by multiplying together one-half the diameter of the head, one-half the circumference of the head, and the traverse; and then deducting the volume of the barrel.

These items have been culled from the 1934 issues of TEXTILE WORLD.

Ewing Galloway

"MOST IMPORTANT . . ."

Wool industry's greatest need for 1935

Improved Merchandising Most Needed

In my estimation the thing which would benefit the wool textile industry most would be an improvement in the merchandising of its product. A large part of the product of the industry today is purchased; it is not sold. To sell its product the industry needs established policy, courage, and a determination to stick by its guns. There is needed a realization that price is not the only element of competition, nor volume the only possible road to profit.

Arthur Besse, *president, National Association of Wool Manufacturers, New York.*

Most Forward Step: Promotion

To my mind, the most important single thing the wool textile industry should do during the year 1935 is the adopting of a promotional plan for their branch of the textile industry.

Such a plan is now formulated, and has been presented to the trade. If the trade will get behind the ideas as outlined in this plan, it will be the most forward step the industry has taken for its own good since its establishment in this country.

Millard D. Brown, *president, Continental Mills, Inc., Philadelphia, Pa.*

Ditto

I think the one big step that could be taken by the woolen industry in 1935 would be to begin a national program of sales promotion. This question has been discussed pro and con for several years. The industry is one of the largest in the textile classification and has so much to favor it in promotion selling that it seems to me a pity that full advantage has not been taken of the situation by all factors involved. I believe it would mean a revival and expansion of one of our basic American institutions.

Thurmond Chatham, *president, Chatham Mfg. Co., Winston-Salem, N. C.*

Base Price on Single-Shift Cost

With the exception of inventory losses due to changes in raw material values, the greatest cause of profitless operation is the all too general and wholly stupid practice of pricing our products on the low general expense yard cost of full code-permitted operation. Full multiple-shift production may be attained for two or three months each season *but it is never averaged for a full year.* Those mills that prudently price their products on the general expense unit cost of single shift operation — which is decidedly the highest annual average we may expect—are invariably forced by the lower prices of competitors, who gamble in pricing their goods on the low general expense cost of multiple shift operation, to either revise their prices downward or lose their share of available business.

If the wool textile industry would, as an industry, agree to and consistently practice predicating its selling prices on the general expense unit costs of the production of a 2,000-hour year many serious losses would be eliminated.

Granville A. Beals, *proprietor, The Greenwich Mills, East Greenwich, R. I.*

Must Get Together

The blankets branch of the woolen division of the textile industry consists of not more than about 40 separate units, well scattered over the nation, and with a relatively small variation in size and strength. The single thing most needed to make this industry profitable is for its individual units to get together in an earnest, sensible way and use, as far as possible, the facilities of the NRA, to meet and solve its problems of cost, excessive production, dumping, and unethical practices. Until a reasonable, practical plan of energetic cooperation is worked out and enforced in this industry, I cannot see the possibility of much profits for any of its members.

In no industry are all the conditions more favorable to cooperative action than in this comparatively small and homogeneous branch of the textile industry.

John E. Edgerton, *president, Lebanon Woolen Mills, Lebanon, Tenn.*

Face Facts Fearlessly

You won't need fifty words for my opinion. It is very short, because in my judgment the most important single thing that our industry can do probably applies to others as well: "Face facts fearlessly and honestly."

Chas. F. H. Johnson, *Botany Worsted Mills, Passaic, N. J.*

This "Cannot Be Printed"

This is a very challenging question. Unfortunately my answer for it is something that cannot be printed. In my opinion, the most important single thing our branch of the textile industry could and should do during 1935 is to convince our Government that there can be no business recovery so long as the men at the head of business are heckled, harassed, hampered and hamstrung.

Writer Prefers to Be Anonymous.

OPPORTUNITY WAITS...

Knocks twice on doors of wool manufacturers

Cooperation Comes Slowly to Wool Mills

ONE must admit that the wool goods industry contains its quota of alert and progressive men. As a working unit, however, the industry has been slower in achieving successful cooperation than the other textile branches. A succession of opportunities was offered the industry through 1934 and a large percentage met direct rejection or dilatory postponement of action.

Thus all plans for more direct control of production, outside of those already in the code, were flatly rejected through 1934; positive action on the long-sought promotion program was postponed; outside of action on immediate problems, about the only definite step of the year was the carrying through of trade practice rules for several branches of the industry. Perhaps the success of these rules will be a bright beacon to permit faster movement along the road of progress during 1935.

As we are writing, the annual meeting of the wool goods trade is taking place and a flood of progressive enactments may make our arraignment of the industry untimely. It cannot make it untruthful for we are talking about the record of 1934, which is what it is. The still almost-new year of 1935 is something else again, and the well-wishers of the industry are hopeful that neglected opportunities of the past will be seized if they come within reach again.

The old year was a record low spot in the history of wool consumption in this country and it is safe to assume that it was ditto in wool fabric production. Much of this shrinkage couldn't be helped; it was the low year of the two-year cycle. Like a heart beat, it seems necessary to have contraction in order to have expansion. The year 1933 was a good one, with large sales and steep gains in inventory values, since wool went up 100% from low to high for that year. Then the down stroke of 1934 plumbed the depths, but laid the basis for a good year in 1935 as a necessary and natural reaction.

Perhaps some of 1934 shortcomings in cooperation may be laid at the door of dull trade; we would not pretend that 1934 could have been made a good wool goods year by any associated action. Competition through most of the year was keen and the labor factor was continuously so uncertain, that it was quite natural for manufacturers to hold themselves as untrammeled as possible with restrictions and limitations. Slack demand brought curtailment to such a point that wool consumption for June, July and August averaged only 8,846,000 lb. clean, each month, while September, the month of the strike, sagged only 10% from that to 7,967,000 lb. The only improvement that organized curtailment could have offered would have been a more evenly spread curtailment, so that all mills could have been running say 25%, instead of some being closed altogether with others running 50%.

Although prices had their ups and downs they were by no means as desperate as they might have been. The raw material situation was relatively firm, though of course prices were gradually sliding off from March to November. The movement was orderly, supported by the Government interest in the domestic wool and a fairly well ordered foreign market. Fabric prices named in March were 10% off from the last previous basis. There was further weakness in the spring; then in the September offerings, prices were heralded as firm but were followed by the principal break of the year, a 12½% drop (largely on worsteds) in October. A large business gradually came forward on this low basis (one three-eighths blood worsted is said to have sold down to $1.25) and in November prices firmed up. Healthier conditions ruled in December with deliveries the thing and most mills' stocks well sold out.

In the low months of the year worsteds were harder hit than woolens. Some exaggerators said the worsted industry met a virtual shut-down for the three summer months, but of course that was not wholly true. In the first half of the year woolens (largely on price appeal) ran away with both men's and women's wear business. Woolen mills were pushing production to the allowed limits. The autumn break in prices put worsteds back

HIGH-LIGHTS OF THE YEAR

Wool

First meeting of Wool Textile Code Authority held. Arthur Besse, president of National Association of Wool Manufacturers, elected chairman. (Jan. 12)

Annual report of American Woolen Co. shows profit of $7,053,088 for 1933, best since 1919 when company made $11,779,804. Loss in 1932 was $7,269,822. (Feb. 5)

N.A.W.M. holds annual meeting. Officers elected: president, Arthur Besse; vice-president, Franklin W. Hobbs, Francis C. Luce and Col. Chas. F. H. Johnson; secretary-treasurer, Walter Humphreys. (Feb. 14)

Industry holds ineffectual meeting and does little except turn down proposals on limitation of hours and wage minima presented by its committees. (March 1)

Stillwater Worsted Mills decides to put into effect 36-hour week with same pay as for 40 hours for trial period of 90 days. (April) (As other concerns failed to follow lead, plan abandoned after trial period.)

M. T. Stevens & Sons Co., No. Andover, Mass., purchases Hockanum Mills Co., Rockville, Conn. Deal largest since American Woolen Co. was put together. (May)

U.T.W. threatens to call a strike on July 2, but things are smoothed over at conference in Washington. Wool Textile Code Authority agrees to expedite formation of industrial relations board, which would also handle silk industry. (June 29)

Response to questionnaire sent out by production control committee of N.A.W.M. shows industry is dissatisfied, wants something done, but doesn't know what. (June)

General strike starts. Lawrence and Passaic areas unaffected but most of smaller mills close. (Sept. 4) Famous Hamilton Woolen case starts on Sept. 6, when flying squadrons close plant.

Strike off, but mills that were closed have tough time finding enough orders to start. (Sept. 24)

Wool Finance Corp. formed in Boston, under Government auspices, to take over unsold wool in Texas and other sections that has been depressing market. (October)

Hamilton Woolen Co. directors vote to recommend liquidation as plant cannot be operated economically with existing labor conditions. (Dec. 19) (Stockholders vote liquidation on Jan. 15, 1935.)

in the running again in a big way. They are the leading item in men's wear for spring though women's wear still favors woolens. However, women's wear buyers are showing interest in men's wear lines so the men's wear woolen mills are not without solace.

The quarterly wool stock report was revived by the Bureau of the Census in cooperation with Wool Textile and Wool Trade Code Authorities after a lapse of four years. It is evident that an effort is being made both in wool stock and in consumption figures to get the industry's statisticians over to a "clean equivalent." The figures will compare somewhat as they always have, though they make the industry look like a smaller volume industry to those who are accustomed to grease basis data. Also, and this gives us still lower figures, greater care is taken to separate carpet wool consumption from clothing wool consumption.

Profits in 1934 among wool mills were scant. Most suffered losses in the second and third quarters. In only relatively few cases did profits in first and fourth quarters counterbalance. There was no tremendous price rise as in 1933 to give inventory profits; rather the decline again gave chance for inventory losses.

The outlook, with better volume almost assured in 1935, is for gradual betterment. If a sufficient number of constructive plans come to fruition this year the industry may finally have the satisfaction of giving itself a boost.

Trade Rules Clean Up Old Abuses

THE biggest thing in the merchandising experience of the wool goods industry this year has been the adoption of trade practice rules under the code. These rules, for the piece-goods selling, yarn and other branches, clean up a lot of the abuses of former years, and bring uniformity where formerly there was a condition approaching chaos.

Uniform sales contracts were specified which must carry ten specified provisions which outlaw cancellations, specify conditions permitting return of goods, provide for separate billing of shipping charges, and set up arbitration practice in case of dispute. Duplicate orders must be signed by the buyer. Maximum terms were set at 1% 10 days net 60 from date of invoice or shipment whichever is earlier. There are provisions for price registration, sample procedure, limitations on unspecified orders, etc. These rules as a whole provide a healthier background for the market and a foundation on which efforts to build larger sales may be set.

The direct merchandising effort of the industry is to come this year. After better than a year of preparation, a program has been laid out and will doubtless soon be in operation. The wool industry has shown itself particularly prone to rise and fall with general business, a fact which some read as an indictment of the trade for lack of ability to stand on its own legs. It benefits from movements with which it has very little to do and over which it has almost no control. It suffers from movements with just the same degree of detachment. With an industry-wide promotional plan in operation it should be possible to foster those outside trends which are found to be already favorable, and to initiate steps to sell goods where none might have been sold at all otherwise. The development of this plan will unquestionably make the merchandising history of 1935.

The idea that the virtues of wool fabrics for particular services were self-evident has, in the face of active promotion of other fibers, forced wool goods to lose ground year by year. In 1910 statistics credited the average adult in this country with consumption of 8 yd. of wool cloth yearly. In 1930, only 20 years later, this had dropped to 4 yd. yearly. This problem naturally centers in the merchandising field and doubtless can be solved given sufficient effort.

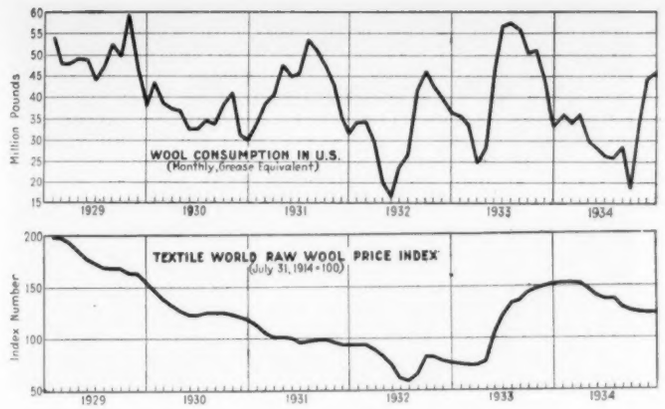
Other progressive moves during 1934 have been seen in the attack on design piracy, the facilities for registering designs and the latest steps taken by more than one large manufacturer to patent his new fabrics; in the successful use of the part-wool and all-wool regulations on blanket labels; in the trend toward a more general regulation of labeling in the industry; in the boost that "synthetic wool" got in the daily papers last fall in news despatches from Germany, Italy, England and elsewhere; in the instinctive resistance to unduly adulterated fabrics which was witnessed in face of a great temptation to cut quality and sell price alone.

The dropping by the American Woolen Co. of its schedule of discounts for quantity purchases changed

Wool and Wool Goods 1934 Prices and Activity

PRICE Textile World Index Numbers	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Monthly Average 1934	Monthly Average 1933
Wool	153	153	152	147	140	138	138	130	127	125	124	124	138	116
Tops	180	180	178	176	166	160	159	150	145	140	137	136	159	134
Yarn	181	181	180	180	170	169	161	160	155	154	154	154	167	139
Cloth	222	222	209	209	209	209	209	209	190	188	190	190	205	181
KEY QUOTATIONS*														
Fine and Fine med. terr. wool	$0.82	.82	.81	.80	.80	.80	.73½	.73½	.73½	.72	.72	.72	.77	.65
Ohio ⅜s	.43	.42½	.41½	.36	.32½	.32½	.32½	.32½	.30½	.29½	.29½	.28½	.34	.32
Texas 12 mo	.83	.84	.84	.81½	.81½	.80½	.72	.72	.72	.72	.72	.70½	.76	.65
Tops, fine 64-66s	1.19	1.19	1.18	1.16	1.11	1.09	1.04	.97½	.97½	.96½	.94	.91	1.06	.95
Tops, average ⅜s	1.07½	1.07½	1.06½	1.04	.94	.91½	.87½	.81½	.81½	.80½	.79	.76½	.91	.83
Tops, high ½	.97	.97	.95½	.94	.86	.84	.80½	.76½	.76½	.74	.72	.69	.83	.79
Noils, fine	.58	.59	.59	.55	.52	.52	.52	.52	.52	.52	.52	.52	.54	.49
2-40s, 60s qual, worsted	1.67½	1.67½	1.65	1.62½	1.58½	1.54	1.47½	1.42½	1.39	1.38½	1.36	1.36	1.51	1.31
ACTIVITY														
Consumption (thousands of lbs., clean, excluding carpet)	12,512	12,075	12,827	10,354	9,483	8,275	8,846	9,417	7,967	12,708	17,584	21,947	11,132	15,516
Carpetwool consumption (thousands of lb., greasy)	8,059	7,697	8,330	7,377	7,355	8,205	5,810	7,030	5,574	5,630	4,759	6,906	6,895	7,850
Machinery (% of capacity)														
Combs	90.5	84.8	74.6	56.7	57.9	49.9	46.2	46.8	35.8	61.3	102.0	128.0	69.5	97.0
Carpet looms	44.0	53.0	52.7	49.5	52.5	57.4	41.1	43.5	38.1	42.2	29.5	37.9	45.1	36.1
Narrow looms	41.7	50.7	46.9	49.2	51.5	37.1	33.0	29.8	22.6	42.6	36.5	35.5	39.7	40.7
Wide looms	82.5	91.4	81.0	69.4	70.9	68.6	67.0	64.1	35.6	56.2	61.0	86.7	69.5	66.7
Woolen spindles	87.5	103.1	94.4	92.6	87.7	91.5	91.3	92.3	58.1	81.2	84.3	99.4	80.3	71.9
Worsted spindles	64.2	63.4	53.3	48.5	49.8	35.9	38.1	32.7	25.8	43.9	60.3	87.7	48.6	63.6

*End of month figure.



a long-standing situation and permitted the company to quote lower prices on its line which were the same to all.

Retailers seemed more than ever tied to price ranges in their garment distribution. In men's wear it was said that most of the business was done at prices less than $1.75 per yard, and by far most of the garment sales, at $25.00 or less. The policy of increasing fabric quality in garments, with cut-make-and-trim unchanged, means only little added cost and has helped build reputation of some of the clothing chains.

Code Creaks But Finally Gets Going

UNTIL Feb. 20, 1935, there had been no general meeting of the wool textile industry since the Feb. 14 and March 1 meetings in New York last year. Last year's meetings disclosed a fine recognition of current problems, but lack of sufficient agreement to permit adoption of any program. This same recoil from united action was evident again last spring when letter ballot was taken on three propositions aimed at better production control. All three were decisively rejected.

The industry's history under a code began when the first meeting of its Code Authority was held on Jan. 12, 1934, and Arthur Besse, president of the National Association of Wool Manufacturers, was elected chairman. Sub-Code Authorities were later set up for subdivisions of the industry. At the first general meeting under the code, the limitations committee reported on plans for hours limitation and machinery limitation as part of a program of production control but they were not favorably received.

The publicity committee made several progress reports beginning with the Feb. 14 meeting and in August it asked to be discharged in favor of a committee of wider scope including also wool growers and dealers. Said the committee, "the time has come for these groups to join hands and work out a satisfactory program jointly." The survey undertaken on the instance of this group was released Feb. 1, 1935, and described in our regular February issue.

The National Association of Wool Manufacturers has become the organized spokesman for the industry. Its previous functions continue for the most part and to them are added duties arising from code operation.

The shadow of the former Wool Institute came momentarily into the foreground last spring when it became necessary to modify the consent decree entered in the District Court by the Department of Justice against the Wool Institute on charges of price-fixing. Such modification was readily granted, and vacation of the decree was followed by the making effective on May 7 of the rules of practice and merchandising for piece-goods selling, commission combers, blankets and sales yarn.

The Wool Textile Code Authority had its first round with the U.T.W. on June 29 when, after conference in Washington, the union leaders made the gesture of calling off the strike set for July 2—the straw man set up just to be knocked down. The concession to union labor on this occasion was formation of an industrial relations board which the strike of two months later was to sink without trace.

The puzzling problems of overlapping codes were acute in certain mills making cotton and wool mixed materials. This was also taken up by the Code Authority at a Washington conference and a ruling obtained on blankets, piece goods and merino yarns. In general this provided that fabrics up to and including 25% by weight of wool, with 2% tolerance, were governed by the Cotton Textile Code; all others by the Wool Textile Code. Merino yarns spun on cotton system up to 45% of wool by weight were placed under the cotton; all others including all such yarns spun on other systems, under the Wool Code.

The association was early in the field with action anticipating a change in code provisions in the spring of 1935 when new legislation will be promulgated to carry on NRA or its successor after June. A policy committee was appointed early in October to consider and propose code revision where experience has shown changes advisable.

Expect Bigger Wool Consumption

THE wool outlook for 1935 points to a decided increase in the consumption of domestic raw material. No importing of foreign wool is likely in volume or price to restrict the movement of the domestic supply into consumption at fair prices. The wool market structure is regarded as in the best shape for a long time. The sharply divided price situation between free and controlled wools has almost disappeared and a return to normal price relations is near to hand. Undue emphasis has been placed on the large wool carryover, and dealers are now inclined to stress the under-consumption of wool during 1934. The possibilities of further inflation are taken into account as well as the probability of a stronger Governmental control over the 1935 clip.

Accredited houses handling Government-financed wools in consultation with the Wool & Mohair Advisory Committee agreed in August that in view of the decline in foreign markets there should be some adjustment of values so that the domestic market might be preserved to the American wool grower. Accordingly, domestic prices were revised downward 10%. Feeling was general that the Advisory Committee had acted wisely in not meeting an earlier demand for revision. The 10% cut brought domestic wool prices to the low of the preceding 13 months. As the manufacturing situation still remained unbalanced, it was thought that another 10% cut might be necessary, but no further action was taken and the price level as of Aug. 1, 1934, is still in force.

Following a strong opening in 1934, domestic wool

prices turned downward, the year closing at the low; but the average price of the territory group for 1934 was about 13c. per clean pound higher than the average for 1933. From all appearances the low prices seen in 1932 when the territory price was 41c. may be regarded as bedrock value. Average monthly prices for the territory controlled wool group follow: January, 79.2c.; March, 79.1c.; May, 76.0c.; July, 76.0c.; September, 67.6c.; October, 67.6c.; yearly average, 73.4c.; January, 1935, 67.3c.

Wool consumption in 1934 fell below 1933 by approximately 200,000,000 grease pounds, the comparative figures being 488,500,000 lb. in 1933 against 280,000,000 lb. in 1934. The use of domestic wool in 1934 was only 65% of the preceding five-year average consumption of 433,000,000 lb. Approximate consumption in recent years, grease basis, on 100% reporting coverage, follows:

1934	280,000,000 lb.	1931	475,000,000 lb.
1933	488,500,000 lb.	1930	356,200,000 lb.
1932	400,000,000 lb.	1928	442,700,000 lb.

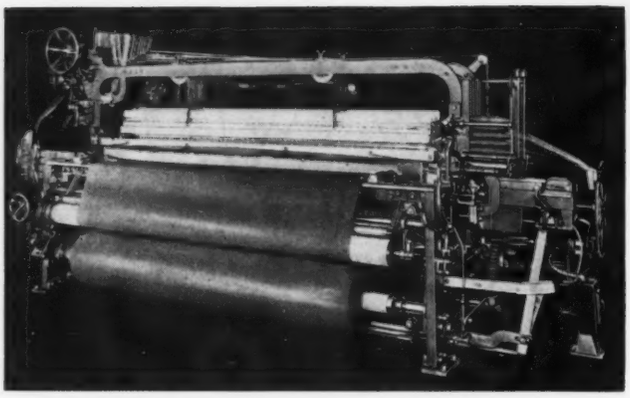
Manufacturing lack of interest in foreign wools was so emphatic that importing during the last six months of 1934 was about as small as at any period since the passage of the 1922 tariff. Total imports of foreign wools for clothing purposes into the United States for 1934 amounted to only 17,199,000 lb. as against 50,853,000 lb. in 1933, a decrease of 62%.

Real Progress in Wool Manufacture

NEW in 1934 were the dressing of woolen direct from ring-frame bobbins, better yarn-conditioning chemicals, an improved model of woolen and worsted loom, an interesting yarn having a fine and flexible metal core, and a humidity controller governed by the regain of the material in process. Temporarily forgotten, although likely to be heard from again, were tape-condensed worsted drawing, long-draft spinning, raw-stock freezing, and elastic men's wear. Coming, although in some cases barely on the horizon, were intersecting porcupines, machines for drying beams in 5 hr. and small packages in less, regain controllers operating on a radio principle, spoolers running twice as fast as present models, and aluminum dresser reels running at 300 yd. per minute.

A year's experience with the small metallic-wired cards for worsted bore out the experimental results attained —namely, a 70% increase in production, a better than 13% decrease in noilage, a greater removal of burrs and other vegetable matter, a reduction in the amount of nep, and the elimination of practically all stripping and grinding. When used to replace old 54-in., two-cylinder, four-lickerin (or breast) cards, the new machines, with their efficient burring sections, appeared capable of paying for themselves within two years. A few mills simply rewired old cards with metallic clothing; others, not handling particularly burry wools, installed only the small-roll carding sections, scorning the preparatory and burring improvements for the time being to reduce installation costs.

Metallic clothing has not been found practical for woolen carding, because the woolen fiber refuses to strip easily and must be frequently plowed out of the clothing. Although it is recognized that the basic trouble is the large oil content in the woolen stock, it is believed



High-speed bobbin-changing wool loom

that a type of oil might be found or developed which would not cause this difficulty. A new angular-wire clothing for use on several of the workers of woolen cards operating on reworked stocks has been given strong pitch, sharp teeth, and a multi-ply foundation with rubber face to pierce and hold threads until they are well carded and to remove excessive quantities of unopened threads, retaining the latter until stripped. Also of interest to woolen carders is a device for combining two ends of roping into one on the tape condenser whenever a carder needs to double his weights.

A few years ago it was discovered practical in certain cases to run worsted ring spindles at a speed some 500 to 1,000 revolutions per minute faster than cap spindles producing the same size of package, and the assumption was therefore made that it would be practical to operate on larger rings at at least the same speed as on caps. Experience, however, has shown this to be a fallacy, at least where the difference in diameters is considerable, due to the amount by which the larger packages increase the load on the frame; and it is now generally recognized that stepping from a $1\frac{1}{4}$-oz. cap bobbin to a 6-oz. ring bobbin necessitates, at least in the case of change-overs, a loss in spindle speed of around 800 revolutions per minute—say, a drop from 5,800 r.p.m. to 5,000 r.p.m.

Therefore, we hear more of 4-oz. ring bobbins today and less of 5- and 6-oz. bobbins, although other reasons than loss of production are partly responsible, such as lower installation or change-over costs for the smaller rings and traverses, lower floor-space requirements, less power consumption, and more efficient handling of the smaller bobbins in doffing, winding, twisting, etc. Although the large-package idea is an important advance in worsted-spinning technic and is sufficient reason for the adoption of the ring method, it is apparent that the extent to which it can be economically carried is limited. For example, when one considers that 64s wool is being ring spun successfully into 4-oz. packages of 30s yarn at a speed of 8,000 r.p.m., it is necessary to balance carefully the loss in production which results from spinning 6-oz. packages at no more than 6,000 r.p.m. against the savings in doffing and subsequent operations.

Of course, each mill has its own conditions and problems to consider and it is probably not entirely safe to generalize. For example, many mills, such as those on mohair, are obliged to give special consideration to their burling and mending departments, where a reduction in knots is of paramount importance. Pile-fabric mills, in particular, reduce their seconds somewhat in proportion to the number of knots, since the pile cannot be repaired.

Hence in such cases the benefits of large packages certainly outweigh the disadvantage of low production.

Best results have thus far been attained in the ring spinning of fairly well-twisted worsted yarns coarser than 30s; poorest results, on the open, full yarns for hand knitting. The application of variable-speed drives to ring frames has permitted output increases as high as 15%.

Woolen ring spinning has shown an increasing quality in the yarn it produces, due partly, no doubt, to machine improvements and partly to the greater knowledge and understanding of frame operation gained by the spinners through experience. Frame-spun woolen yarns are now said to average 8 to 9% stronger than equivalent mule-spun yarns, due mainly to their greater evenness. Recent estimates have shown that, in some mills, production per ring spindle is three times the production per mule spindle. The increased production, plus the benefits of large packages, has made possible savings in direct-labor costs ranging from 2½c. per lb. to as high as 5c. Based on a saving of 3c., ring spinning is estimated to pay for itself in about two years on a single shift, and of course in one year on a double shift.

The frame is continuing to foster the trend toward general rewinding of woolen filling yarn, which puts 25 to 40% more yarn on shuttle bobbins; and this year it has led to a new development—warp dressing direct from spinning bobbins. In the latter case the bobbins from the frame are shunted by the spoolers, and put directly in the V-shaped dresser creels, whence they feed to the reel over end on the magazine principle, the yarn switching to a full bobbin when the original bobbin is exhausted.

Suppressed for almost fifteen years was a report of experiments conducted by the Wool Industries Research Association of England, in 1919, to determine the relative merits, from a quality-producing standpoint, of the Bradford and French systems of worsted spinning. In 1934 this report appeared in the *Journal of the Textile Institute,* February issue. It considered various combinations of processes. French-combed yarns, it indicated, give a better fabric handle and lend themselves more satisfactorily to felting and the production of covered-face fabrics, although conversely, of course, they do not permit the production of equivalent clear-cut weave effects. Also, the report showed, the "products of cone drawing are weaker and less elastic" than those of French drawing. Unbackwashed material "provided the best cloth of the range, also the strongest and most elastic yarns and cloths," except those produced of mule-spun yarn. Second to the unbackwashed cloths in strength and elasticity were those woven from French-drawn, cap-spun yarns. Few differences were found between knitted fabrics produced from the various yarns.

In twisting, the horizontal roll continues increasingly to supplant the dolly roll, aided and abetted by improved trap motions. Cotton ring twisters have been successfully modified for use on worsted. A new cone creel for over-end draw on twisters affords adjustable tension and will remove kinks from hard-twisted singles. Details of a new spooler, which is said to run at 250 to 300 yd. per minute, as against the 120 to 150 yd. of the model it replaces, will be announced shortly.

Experiments conducted during the year indicated that unusually good results in yarn conditioning, with respect to speeding up the process and attaining lasting effects, can be secured by the addition to the water of a high-boiling solvent, such as diethylene glycol, and a non-volatile penetrant, such as sodium alcohol sulphate. An increase in weight was apparently gained by the use of these materials.

We have already mentioned, in connection with woolen ring spinning, the attempts now being made to dress warps direct from frame bobbins. Another early innovation in warp preparation is expected to be a light-weight, aluminum dresser reel capable of operating at 300 yd. per minute from cones, cheeses, or ring-frame bobbins. Its stop motion, acting through an efficient brake, will bring the reel to a complete halt within half a turn.

Perhaps the most outstanding of the new wool machines which 1934 brought to us is the automatic bobbin-changing loom which is capable of weaving the entire range of woolen and worsted fabrics, including heavy, hard-beaten goods, at a speed some 10% greater than that of previous models. It marks something of a departure from the restrictions imposed on mills by specialty looms and will be built up to 120 in. between swords with 26-harness and 4x1- or 4x4-box capacity. Particularly interesting among the many new features of this loom is the "floating" binder, which binds the shuttle very tightly when it enters the box and releases it entirely as it leaves.

Lastex men's wear, which created so much interest late in 1933, made little headway in 1934, due possibly to the fact that no completely satisfactory way was discovered for fulling many Lastex fabrics in a manner not restrictive to the contraction of the lactron core after stretching; but another equally interesting novelty made its appearance. This was "Metaltex"—a fabric woven or knitted on regular machinery from yarns having a fine and flexible metal core. The wire can be heated electrically for such uses as automobile upholstery and robes, blankets, gloves, aviators' uniforms, and rugs; or it can be employed solely to give strength, as in paper makers' felts, upholstery, etc.

One of those inventions which it seems someone should have thought of years ago is a new humidity controller actuated by the decreasing or increasing weight of a sample of the actual stock in process as it takes on or gives off moisture, thus tending to insure a more constant and accurate regain.

Of all the signs which today indicate that technical progress is really under way in the woolen and worsted industries, the most encouraging is the energy with which the wool subcommittee of the American Society for Testing Materials is undertaking to iron out the many differences and idiosyncrasies of the detached groups which make up the wool trade. Until this subcommittee was formed, barely more than two years ago, there was no place where a wool man could turn to decide or to determine what specifications were right, what product qualities he should be getting, what tolerances he should be allowed, what tests he should conduct, and what terminology he should use. During 1934 this organization conducted work on estimating the hard-scoured content of wool in the grease, determining the free fat and soap fat content, establishing a standard yarn-numbering system (favoring the Typp system used by the Bureau of Standards), adopting standard terminology for designating the directions of twist (favoring "S" and "Z"), developing specifications for both woolen and worsted yarns, and establishing standard methods for rug and automotive-felt testing. The woolen and worsted mills are showing an inclination to keep this new beacon of order and authority gleaming.

PRACTICAL HELPS for Wool Overseers

WORSTED SPINNERS have found that it pays to clean frames systematically. Monday: Wipe leather front rolls with a damp cloth and brush out separator tins at a doff. Tuesday: Clean out all waste from bottom and top front rolls. Wednesday: Clean all waste from carriers and joints. Thursday: Clean all back rolls and brush out roving creels. Friday: Brush out tape hangers and clean all rails and frame ends with cloth.

•

FAST-RUNNING looms must have more binder surface touching the shuttle than is necessary with slow-running looms. At least 1½ in. is required.

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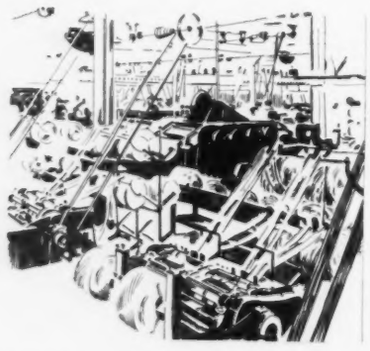

SILK-WOOL blends can be made successfully on regular French sets of drawing equipped with intersecting gill boxes. The blend is made in the usual manner, care being taken to obtain a good mixture of the doublings on the first box.

•

BLENDING of a small quantity of good-quality rayon with the fairly fine botany wool required for making etamines reduces the manufacturing cost and gives a lustrous effect which enhances the fabric.

•

RESEARCHES on yarn conditioning indicate that the use of a high-boiling solvent in conjunction with a non-volatile penetrant gives excellent twist setting and increases the weight of the yarn.

•

IF A WEAVE room replaces the worn parts of its pattern chains systematically, the cost will not average more than 25c. per year per loom. If it waits until the chain gives out, it may cost $100 per year per loom.

•

USE OF a cleaner roll of about the same diameter as the feed roll will prevent fine and heavy ends and "choke-ups" when an Apperly feed is running on heavy work with a high percentage of long fibers.

•

A BEAUTIFUL "merino" yarn can be produced by mixing half wool and half cut rayon at the hopper. Close the grid bars at the picker; run the web slack at the drawing and reduce the speed; use a light, unweighted middle roll in spinning.

•

THE BRADFORD system can also be used for making silk wool blends by using gill boxes having 2-in. front rolls and screws of ⅜-in. pitch. Ratch for the longest material in the blend, control the shorter material through the carrier and twist, and arrange drafts to suit the shorter material.

•

TWO TYPES of draft are employed in woolen spinning: true spindle draft applied after the rollers stop, and carriage drag. The second method can be used for coarse wools or mixtures of wool and cotton. On fine wools, however, it is almost certain to result in twitty yarn.

•

FRENCH CHALK is an excellent aid in preventing carrier laps in worsted spinning. Another arrangement is to wrap the carriers with paper, leaving a loose flap to flick off the first fibers forming on a new lap.

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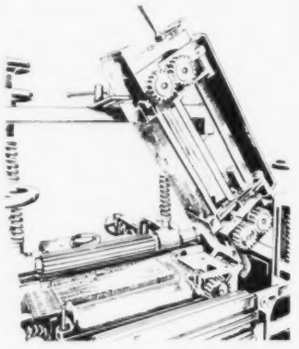


EXPERIMENTS indicate that intelligent use of the intersecting gill box would make it possible to eliminate at least three of the operations now required to reduce top to roving by the Bradford system.

•

IT IS desirable to have the two cylinders which drive the box motion of a wool loom operating in unison. Where this is not possible, the lower cylinder must operate ahead of the top cylinder; never the other way around.

•

BREAKAGE of ends between the spools and back rolls on a woolen ring spinning frame can be due either to too fast or too slow a feed. If the roping is fed too fast, the ends will run loose, increasing their slack until they twist back on themselves and snarl, or start to backwind on the spools. If the roping is fed too slowly, there is a tendency for draft to be introduced, which will result first in a fine end and then in a broken end.

•

TAKING-OFF strippers on double doffer condensers should be examined once a week, and both strippers set alike. If this is not done, one doffer may deliver a fuller and rounder yarn than is obtained from the other.

These items have been culled from the 1934 issues of TEXTILE WORLD.

Rittase

"MOST IMPORTANT..."

Rayon industry's greatest need for 1935

Continue Sound Policies

I can only recommend the continuance of policies that are sound and workable and the abolishment of those that seem to have outrun their usefulness. Progress can always be made by keeping an open mind and being alert for new possibilities, in the meanwhile improving equipment to supply better and sufficiently diversified products so that new ideas can readily develop. This brings into existence better and more attractive fabrics and the chance of opening up new and as yet untouched fields.

The year 1935 seems to be rife with many such possibilities.

S. A. Salvage, *chairman, Rayon Yarn Code Authority and president, The Viscose Co., New York.*

Production-Price Formula Needed

Undoubtedly the most signal success that any group of manufacturers could achieve within the next year would be the development of a formula by which production could be so regulated that the industry or section thereof give steady employment throughout the year to its help and at the same time produce goods to the extent that they can be sold at a reasonable advance over cost of manufacture and yet not be exorbitantly priced to the consumer.

C. W. Dall, *executive vice-president, National Rayon Weavers Association, New York.*

Educate the Consumer

Provide fabric manufacturers, cutters, and retail stores with more facts concerning the various types of synthetic yarns now on the market. Yarns made by different mechanical and chemical processes have diverse characteristics and qualities. Our experience indicates that it is essential to get this information through to consumers at the point of sale.

S. R. Fuller, Jr., *president, American Bemberg Corp., New York.*

Curb Labor-Minority Racketeering

I feel emphatically that the most important single thing our branch of the textile industry, or any other branch, could and should accomplish during 1935 to render the industry a more profitable and more stable field of activity, both for labor and capital, would be the finding of some means of curbing the devastating effects of selfish and irresponsible minority groups of labor organizers and organizations, and the exposition for what they are of the racketeering misrepresentations that are continually flooding the country. The industry should direct intensive efforts in this issue through all possible channels.

J. Spencer Love, *Burlington Mills, Greensboro, N. C.*

Discard Bonus Agreement

The most important single thing I would like to see accomplished, whether it be this year or next, is the complete elimination, lock, stock and barrel, of the so-called bonus agreement now extant in the rayon producing industry.

Recognizing the fact that buyers with large purchasing power will always command a better deal, it would seem to me that a more simple device for a definite commitment of 30, 60 or 90 days, based on a sliding scale of quantities ordered and performance, would be more in line with the present needs of the industry.

Hiram S. Rivitz, *president, Industrial Rayon Corp., Cleveland, Ohio.*

Technical Improvement

Establish a cooperative technical service bureau to define and set standards for warp stretch, filling tension, throwing and other stress on yarn; to improve rayon cloth constructions; to study and establish the cause of faulty material containing rayon.

The work of such a committee would rapidly lead to a more improved standard for all rayon garments, which eventually would reflect in increased tonnage and profits.

Leon H. Ryan, *general manager, Delaware Rayon Co., New Castle, Del.*

"Marriage," not "Battle," of Fibers

In the last analysis any great industry survives and goes forward to greater heights only by creating and satisfying new wants of the people. For the first time in the history of the world the prices of natural and man-made textile fibers are so low and so near together, that silk can be substituted for rayon, or acetate for silk, etc. This has been called The Battle of the Textile Fibers. It lies in the power of the synthetic textile industry to change this so-called "Battle" of substitution into a "Marriage of the Textile Fibers," creating new fabrics, each so radically different in texture, drape and appearance that my lady wants, and can afford to have two gowns, where heretofore she wanted and could have only one.

A. M. Tenney, *The A. M. Tenney Associates, Inc., New York.*

Joint Promotional Campaign

I believe the most important thing the rayon industry could do for the year 1935 would be to institute a promotional campaign in cooperation with the users of rayon yarn and the large retail outlets, stressing and bringing out into the open the intrinsic value of all properly constructed rayon fabrics, and the beauty and durability of these fabrics, in an endeavor to educate the buying public to an appreciation of the real merit of rayon yarns and fabrics; to obtain public acceptance of the true facts that are now to a considerable extent hidden.

L. A. Yerkes, *president, Du Pont Rayon Co., Inc., New York.*

NO MORE RED HERRINGS

Rayon's Hope for 1935 Is to Settle Down to Everyday Work

Extraneous Affairs Jam Rayon's Year

IT'LL be a grand day for rayon when that industry is permitted to devote its attention exclusively to the production and distribution of synthetic yarn. That observation is not made ironically; it is a sincere thought provoked by a study of rayon's 1934 adventures in their relation to the industry's 1935 outlook. Last year was a big parade of extraneous affairs—each matter important enough in its own way, but all combining to distract the rayon executive from his everyday tasks. The processing tax, which hung over the trade all year like the sword of Damocles; the Federal investigations, the NRA adjustments, the strikes—all were disrupting factors, and when to these we add the more or less normal price fluctuation problem, the composite picture is that of an industry preoccupied with everything on earth but its own routine job.

Which of course is not at all true. Despite the harassing and impeding effects of these extra-industry matters, rayon's showing for 1934 was most encouraging; according to reports submitted to *Textile Organon* by 90% of the industry, production last year was 1% above 1933, thus setting a new high record for the industry. The 1934 output totaled 210,331,000 lb. against 208,530,000 in 1933. This showing came as a distinct surprise to the trade, the general expectation having been that 1934 would be below 1933.

Earnings in some cases were definitely ahead of 1933,

World Rayon Production

Our Manchester (Eng.) correspondent estimates world rayon production in 1934 at the record total of 788,855,000 lb. against 670,681,000 lb. in 1933.

At the start of the year, producers were improving their fiscal position. One major company which reported about $700,000 net in the first half of 1933, nearly doubled that figure in the same period in 1934. Another company reported $40,000 profit in the first quarter of 1933—and shot up to a quarter-million net in the parallel period of 1934. While the financial showing is far from uniform throughout the industry—for example, one small company suffered an 18% drop in profits in 1934 as against 1933—the aggregate picture is one of progress. The obvious explanation for the improvement is the healthier position of industry generally; however, new production methods developed by the rayon companies served to lower output costs, which in turn contributed to the year's gain.

We cannot credit the improvement to any pronounced stability in the market. At that end, the picture was marred by frequent disturbances some of which were wholly beyond the control of the producers. In April, 1934, the production of viscose yarn was sharply curtailed by a strike of Viscose Co. employees, and in June a strike ensued at the Hopewell, Va., plant of the Tubize Chatillon Corp.; finally the Hopewell strike decided the Tubize company to discontinue production of nitrocellulose yarns, which marked the end of rayon production by the nitro process in America. These difficulties, together with threats of strikes at other rayon plants made for an uncertain market. With respect to prices the 1934 record has two highlights—first, a spring recession which pulled most yarns down, and brought 150-40 viscose process yarn, the industry's key number, to 55c; and, second, a double end-year advance which affected acetate and viscose yarns, lifting 150-40 to 60c.

However, price behavior in 1934 is important to us now only for what it denotes as to probable price trends in the current year. If, as yarn producers claimed, the rayon decline of last spring was due largely to raw silk weakness, then the present encouraging outlook for the cocoon fiber should point toward maintenance, if not toward a further advance of rayon levels. Indeed, if we are to accept the theory of the two-year cycle in textiles, rayon should share a general upward movement, both in sales and earnings during 1935.

Whatever 1935 may bring in the way of increased business, it is clear from the industry's expansion policy that producers will have no difficulty in meeting such new demands as may be forthcoming. The year 1934 was marked by continuation of the expansion so widely projected in 1933. From the Celanese Corp.'s $500,000 program of development at Amcelle, Md., on

HIGH-LIGHTS OF THE YEAR

Rayon

Acetate prices reduced, with range from 10c on 45 denier to 22c on 150 denier. (Feb. 22)

Ten rayon producers offer general denial to charges of monopolistic practices brought by Federal Trade Commission. (April) (Hearings held May 28 and Sept. 17.)

For first time since its formation, American Glanzstoff has satisfactory year, netting $1,288,578 in 1933. Name to be changed to North American Rayon Corp. (April)

Viscose prices, after eight months of stability, are reduced, with Industrial Rayon Corp. leading the way by putting 150/40 at 55c, down from 65c. (April 24)

Hopewell, Va., plant of Tubize Chatillon Corp. closed because of labor trouble. (June 29)

Tubize Chatillon announces that its nitro-cellulose plant at Hopewell will not be reopened. (July 25)

General strike does not bother rayon producers, but weavers, particularly in middle-Atlantic States, are quite badly crippled. (September)

Industrial Rayon Corp. introduces spun-dyed yarns, dyed in solution before spinning, at price 5c above natural. Available in two colors. (September) (Previously Celanese had introduced spun-dyed black).

Rayon Weavers Association holds second annual meeting, offers full cooperation with other industries and with Government. (Dec. 4)

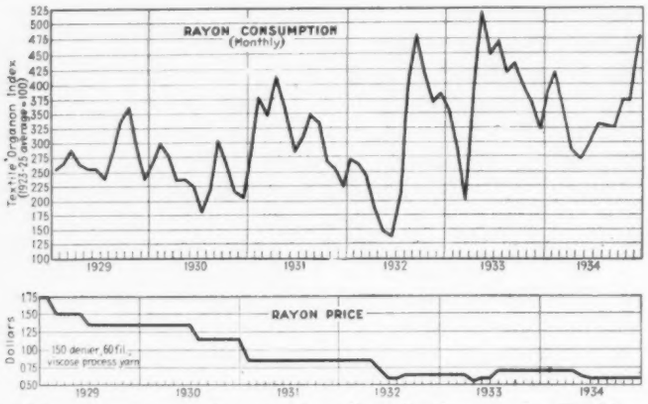
Rayon has prominent part in Silk and Rayon Convention held in New York. Meeting regarded as particularly interesting. (Dec. 7-8)

In middle of month, viscose prices are advanced 2-3c. per lb. On last day of month, further advance of 2c. brings 150/40 up to 60c. from 55c. Viscose Co. raises acetate prices to basis of 70c. for 150/36, but other producers are slow in following lead and situation is uncertain for a time. (December)

the one hand, to the DuPont Rayon Co.'s $5,000,000 program on the other, the industry presents a broad picture of building and equipment installation activity.

A Sales Record to Be Proud of

THE industry's expansion policy immediately raises the vital question: What are 1935's sales prospects for rayon? While obviously no one can answer for the mercurial antics of business generally, it may be said with some assurance that, if 1935's volume depended solely upon reaping the results of good merchandising work done during 1934, then there would be little to worry about. The rayon industry's merchandising record during 1934 is one to be proud of. From the point of view of cooperative effort, the outstanding promotional



achievement was the merchandise display at the Fashion Group's Man-made Fibers and Plastics Exhibition, held in New York in April. Reviewed in the perspective of nine months, this, the most dramatic and comprehensive showing of rayon's progress ever made, takes on added significance; it argues strongly for further effort by the industry in the same direction. For some time rayon leaders had been considering the idea of a cooperative promotional drive; sentiment for such action strengthened last year as a result of silk's significant upward climb. Accordingly, producers and leading rayon weavers evolved a tentative plan for a three-year promotional drive, to cost $300,000 yearly and to be subscribed half by producers and half by weavers. Up to current January the history of this much-needed campaign has been a record of vacillation, uncertainty and hope-deferred.

But for all the uncertainty as regards the campaign, at least the companies are putting their best foot forward in other types of promotion. The main emphasis has been in developing rayon-consciousness among retailers, and here the producers have been notably successful. In this respect the two chief notes for 1935 are: first, increased featuring of rayon merchandise by stores, including more adequate identification; and second, increased trend to separate rayon departments and to promote the fiber individually.

The benefits which 1934 brings to 1935 in rayon merchandising are numerous. These include: Wider acceptance of the generic term "rayon," due largely to France's official endorsement of that word's French equivalent "rayonne"; stronger demand in the quality field, as result of intensified promotion in the consumer quality magazines; and—last but not least—the virtual elimination of costly exclusive fashion shows in favor of those which bring rayon more directly before the average consumer.

Good-Will Gains by Code Work

"PRODUCERS are more inclined to cooperate with each other"—put a period at the end of that statement, and you have in a nutshell the story of how rayon has benefited by the NRA in 1934. At the opening of the year the outlook was dark with complications. Chief among these was the problem of inter-process rivalry which was based on the fear that the Code Authority as originally conceived would permit one group to dominate the industry. To eliminate this apprehension, it was decided finally to give all producers individual representation on the Code Authority, and this plan won general approval. This novel type of Code Authority, with its 100% industry identity, was officially accepted by the NRA on June 18, and functioned from that date on. A new cooperative spirit was engendered by the happy solution of this problem, and this more liberal attitude promises to be an important asset to the industry in 1935.

At present the functions and activities of the Rayon Code Authority are very limited. However, several problems of significance now are crystallizing and are being studied with a view to possible action on them by the Code Authority. Chief among these are three needs: first, standardization of freight rates and possible substitution of F.O.B. for present freight allowance; second, yarn quality standards; and third, a standard contract for the industry.

If increased trade cooperation was an NRA gift to the yarn producers, the same might be said, and perhaps even more truly of the rayon weavers. These fabric manufacturers, who previously had been very individual-minded, now are definitely industry-conscious and are welded firmly into a strong trade association. At the annual meeting of the National Rayon Weavers Association last December it was announced that that body

Trend Figures for the Year in Rayon

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	1934 Monthly Average	1933 Monthly Average
PRICES														
Viscose														
75 denier (30 fils)	$1.00	$1.00	$1.00	$1.00	$1.00	$0.90	$0.90	$0.90	$0.90	$0.90	$0.90	$0.90	$0.94	$0.94
100 denier (40 fils)	.85	.85	.85	.85	.75–.85	.75	.75	.75	.75	.75	.75	.75	.78	.78
150 denier (40 fils)	.65	.65	.65	.65	.52–.65	.55	.55	.55	.55	.55	.55	.55	.58	.60
Acetate														
150 denier	1.00	1.00	.78	.78	.78	.70	.70	.70	.70	.70	.70	.70	.77	.90
Cuprammonium														
150 deniers (112 fils)	.90	.90	.90	.90	.90	.70	.70	.70	.70	.70	.70	.70	.78	.82
ACTIVITY														
Consumption Index (Textile Organon. 100 = daily average 1923-25) unadjusted	389	423	344	289	273	299	332	303	300	375	374	477	348	385.3
Imports, pounds (for consumption)	14,938	13,410	7,184	10,060	3 951	1,412	9,524	4,857	876	3,848	6,507	824	6,449	77,842

represents 50,000 looms. This division continues under the Cotton-Textile Code and the weavers grow increasingly satisfied with their code status.

Many Useful Changes in Technic

OF the numerous developments in synthetic-yarn production, perhaps the most significant from the viewpoint of the textile man is the trend toward the complete taking over of the early processes of the rayon-textile mill by the rayon manufacturer. A few years ago rayon was available only in skeins; today it can be purchased in a variety of package forms, including regular, oiled, and pigtail cones; bottle and double-head bobbins; spools; parallel tubes; and cops. Generally speaking, the rayon producer is able to do a better winding job than can the textile mill, and the latter is insistent in its demands for an even more complete range of packages than is now obtainable.

Another innovation in yarn manufacture which holds interesting possibilities is the commercial production of so-called "spun-dyed" black acetate yarn and light shades of viscose yarn. Rayon filaments have become finer and finer, and shortly before this was written one producer announced a cuprammonium yarn ranging from 50-denier with 75 filaments to 150-denier with 225 filaments. Slash pine has been suggested as a raw material for rayon, and this possibility is now being investigated. The 50th anniversary of the invention by Chardonnet of the nitrocellulose process marked the final abandonment of this method, and for the present leaves the field to the three healthy survivors: viscose, acetate, and cuprammonium.

Each year, the prophets tell us, we approach nearer to the time when spun rayon of one type or another will have replaced cotton, wool, and the other staple fibers. Although Germany is most anxious to bring about this event in order to relieve its high raw-material costs, the most important step forward in 1934 was apparently made in England, where Courtaulds, Ltd., began the spinning of rayon on cotton machinery. For the purpose Courtaulds acquired a mill equipped for spinning Egyptian cotton and found that to handle $1\frac{7}{16}$-in. rayon staple few modifications in machinery were necessary. The same has been found true by American staple-rayon spinners. The yarns produced by Courtaulds were asserted to be superior to combed Sakellaridis in evenness, appearance, and handle; and, although they were no stronger than yarns made from considerably shorter cotton, it must be remembered that most cotton yarns are made from shorter staple and that $1\frac{7}{16}$-in. rayon is no more expensive than 1-in. or even shorter rayon. Courtaulds substitutes for the fiber spiral which gives cotton fibers their ability to cling together a fiber curl similar to that which is responsible for the spinnability of wool.

Considerable effort has been expended in perfecting methods for soaking rayon crepe yarns, but all of the factors influencing crepe or pebble are not yet known, and further study is necessary. Use of the Babcock milk tester has been found to afford a simple method for determining the take-up value of rayon soaking solutions. A study of twist setting made recently indicates that the electrical steam box developed a year or so ago gives results superior to those obtained with the ordinary home-made steam box used originally.

One by one the principal causes for stretched rayon have been ferreted out and largely eliminated. As the major sources have thus been dispensed with, the minor sources have naturally assumed greater importance; and recently critical attention has been focused on the redraw frame. The improvement here is being effected by the use of efficient tensioning devices, by general refinement of the machine, and in some instances by the substitution of loose creel pins for the stationary pins and fixed gudgeons. Among other redrawing developments of the year was a new frame made spindleless to eliminate jumping or wabbling of bobbins, permit quicker replacing of bobbins, and allow speeding up the machine. Another can be equipped, when so specified, with twister-type take-up and automatic arrangement

A variety of package forms comes from modern rayon plant

for lifting bobbins out of contact when threads break. Redraw frames, like all the other throwing machines for rayon, are now being made oilless.

An important piece of research launched during the year is a study of the take-up in rayon yarns due to twist. Interesting tests conducted on the friction of rayon yarns in knitting disclosed that too much oil decreases the lubricity of the yarn, that mineral oils lubricate better than vegetable oils, and that friction is higher with oils of higher viscosities and increases with rancidity. Experiments were also conducted on the effect of various yarn properties on the amount of creping in the fabric. Rayon men began to use the terms "S" and "Z" for designating direction of twist, a rayon company, a throwing-machine company, and a testing house adopting them for standard use.

The importance of proper sizing—both to the weaver and finisher—has led to the development of improved methods and equipment. One new sizer utilizes the hot-air system of drying; another is of the five-cylinder type and is designed for high-speed production with positive tension control. Other improvements in sizing equipment include quick change gears to permit regulation of stretch; a device to maintain any predetermined percentage of moisture in the sized warp as it leaves the slasher; and a control system designed to regulate temperature of size in size kettle and size box, level of size in size box, and temperature of drying cylinders. Cooperative research on sizing, for which plans are now being formulated by the United States Institute for Textile Research, is expected to result in a more complete understanding of the conditions which must prevail if best results are to be obtained.

PRACTICAL HELPS for Rayon Overseers

BAR MARKS in rayon crepes can usually be traced to one of the following conditions: loose arms and bearings on the loom, giving the reed too much side play; shuttle chafing in the shed; beam sticking in the brackets; take-up motion not properly adjusted; or harness not timed correctly.

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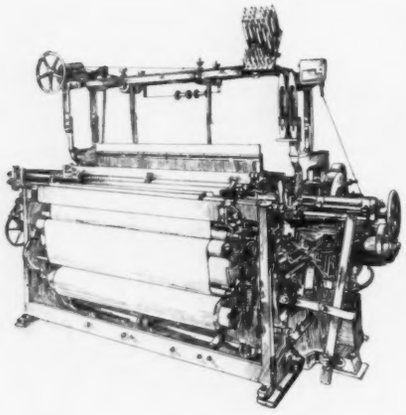

ALLOW AMPLE reed space in weaving rayon fabrics; many weaving faults are caused by improper balance between reed space, gray width, and finished width.

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THIN SPOTS in rayon taffeta are often due to a saggy reed or to lame dents. Defects of this nature are accentuated by use of improper sizing materials.

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A BEAUTIFUL moss crepe effect can be obtained by employing a yarn composed of a bright acetate wrapped around a rayon crepe. Cross-dyeing the acetate and rayon produces attractive speckled effects.

•

WHEN TREEBARKS are not produced by means of an embossed finish on a satin construction, they are usually obtained by picking two threads of coarse or bouclé crepe and two threads of very light crepe of opposite twist. Another way is to employ a filling of uniform size, but with two picks of full-twist crepe and two picks of opposite soft-twist crepe, the latter at least ten turns under the former.

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PENETRATION of gelatin sizes on rayon can be determined by placing a sample of the sized yarn in a solution of wool dyestuff in absolute alcohol. The gelatin is dyed, while rayon or acetate yarns are not colored. By observing how far the dye has penetrated, one can tell how far the size has penetrated.

•

THERE ARE three remedies for filling kinks in rayon crepes. Reduce the number of turns and amount of tension in quilling; time looms so that shed will close on the filling before the shuttle comes to a complete rest in the receiving box; tighten the tension on the filling in the shuttle.

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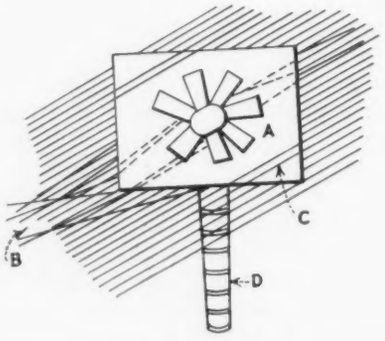

THE LOOM thread separator illustrated above enables one to remove tangles from warps and to proceed with the weaving. The paper plate *A* rests on the warp threads, and an empty bobbin *D* hangs down between the threads *B*; if the tangling is quite bad, it is advisable to place a few threads *C* to the left and right on the plate.

•

TO DETERMINE whether or not rayon has been stretched beyond its normal limit, take a measured length of yarn, wet it out with water, dry, and re-measure. The percentage loss in length of the original yarn roughly approximates the percentage the yarn has been stretched, both measurements having been made under constant conditions of temperature and humidity.

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ANOTHER indication of whether or not rayon yarn has been stretched is the denier test. One can expect a denier variation of 3% plus or minus in normal yarn. If the denier varies more than 5%, stretching should be suspected, but confirmatory tests should be made.

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IN FINISHING rayon crepes made from highly twisted yarns which crepe quickly, the fabric often "grins." This fault can be avoided by calendering the fabric heavily before creping.

•

IN DRYING rayon warps, keep the first cylinder at a lower temperature than the following ones. A temperature of 140° F. is sufficient for the first cylinder; 180 to 200° F. for the others.

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WHEN controlled humidity in the preparation of rayon warps is impossible, run the skeins and the warping machine empty the last day of the week, so that the yarns will not be subjected to weather changes over the week-end.

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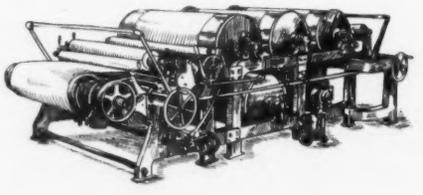

EXCESSIVE stretch should be avoided in sizing rayon warps. Anything above 6% stretch is generally considered excessive for 100-denier viscose; anything above 7% for 150-denier.

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DANGER OF streaks in woven fabrics is lessened by warping directly off cones.

These items have been culled from the 1934 issues of TEXTILE WORLD.

R. K. Laros Co. and No Mend Hosiery Mills

"MOST IMPORTANT . . ."

Silk industry's greatest need for 1935

Recommends Code Consolidation

President Roosevelt has recommended that Congress renew the NIRA for a two-year period. Apparently there may be some minor changes and some additional administrative powers given to the National Industrial Recovery Board and to the President.

The experimental period of textile codes is past. We cannot, from a practical standpoint, fix prices. Apparently we cannot correct the practice of selling below cost. We know now there are distinct limits to efficient production control. Some trade practice provisions have worked and have more than paid textile employers for their code assessment, but others have not worked.

With 15 or more months' experience behind us we must now look to reduction in code operation expense through code consolidation. We must put code administration on an efficient, business-like basis.

This will be the big accomplishment in 1935.

Peter Van Horn, *president, National Federation of Textiles, Inc., New York.*

Increase Volume Through Promotion

It is difficult to pick from the varied important functions of the Throwsters Research Institute any particular item and regard it as the most important. I feel, however, that probably the most constructive work, and that showing the most definite results, will and should be along the lines of promotional work to increase the volume of business in the industry. By this I particularly mean, in the throwing industry, to increase the use of high twist yarns through promoting the use of sheer type fabrics.

I could, of course, enlarge upon this and other almost as important things in our present and planned activities, but in accordance with your request I am confining myself to this single item.

H. E. Bishop, *executive secretary, Throwsters Research Institute, Inc., New York.*

The Reasonable-Profit Motive

The past two years, if any can be singled out in our gradual development of men and methods, industrially speaking, have been characterized by a desire for planning. Not planned economy, not planned budgets, not planned employment, or working hours, but the recognition of a constantly changing planned adaptation to actualities.

Industry can meet this requirement in two ways: first, by visualizing and estimating the constantly changing potential consuming capacity of the immediate future; and, second, by taking notice of the fact that without the motive of a reasonable profit as the chief incentive, our industrial structure must go to pieces. If we can educate ourselves and each other to the sense of the indispensability of such a motive of reasonable profit in our business, there need be no price fixing in our codes and we will unconsciously work for sound business; as unconsciously as we breathe under conditions supplying that quota of oxygen which our system needs for its survival.

Sidney Blumenthal, *chairman, Sidney Blumenthal & Co., Inc., N. Y.*

Supply-Demand Factor

The question of what might be silk's major need to increase profits in 1935 is a big order and one that embraces many factors. However, it all may be summed up in this: We need a better understanding of the potentialities of supply and demand, and a better spirit of cooperation.

Paolino Gerli, *E. Gerli & Co., New York.*

Increased Use of Twisted Silk

The most needed activity of the throwing industry lies in promoting greater use of twisted real silk threads in fabrics. Spindles and looms yield heavier poundage production when operating on rayon, so that fewer units are used; and existing facilities can be brought to full operation only by increased use of twisted real silk.

Henry J. Tynan, *president, Throwsters Research Institute, New York.*

Centralize the Merchandising

I think it is generally recognized that our most difficult problem is in connection with merchandising. You probably know that the merchandising of the silk and rayon branches of the textile industry is broken up into many units, ranging from fairly substantial size to inconsequential size, and a rough estimate would indicate that there are probably at least 500 different firms merchandising fabrics in the finished state. It is my conviction that it becomes increasingly necessary each year for some method of developing coordinated or group action between these merchandisers, both from a styling and selling viewpoint. This might be accomplished through a number of mergers in the merchandising units, thereby creating units of such size and responsibility, that they would be more constructive in both their planning and selling. I realize the difficulty of evolving absolute mergers. On the other hand, in lieu of absolute mergers, groups could be formulated to centralize their styling and selling and yet maintain their individual identities.

To say the least, the question that you submitted is timely, and I trust that you will receive sufficient worthwhile responses that may start the industry on the road to better days.

Writer prefers to remain anonymous.

REDUCING DIET

Curtailment aids silk fabric trade in 1934; improves outlook

Economics of Silk Trade Are Sounder

IT is easy to write encouragingly about the broadsilk industry's profit prospects for 1935; indeed the temptation is rather to err on the side of over-optimism. The favorable factors, financial and economical, at least balance the unfavorable; and when to these is added the psychological value of the increased silk consciousness among consumers, the chances for better earnings this year seem to be quite promising.

Among the chief point-with-pride items in the inventory are: decided fiscal improvement as reflected in yearly reports, firmer market position, and healthier viewpoint by management regarding the immediate future. It is scarcely necessary to add that these fundamental benefits have had a steadying influence throughout the industry. The improvement may be attributed to three causes: first, a carefully directed attack on the industry's surplus stock problem, through curtailment; second, successful merchandising effort both individually and collectively; and third, consumer trend to quality.

Financial reports for 1934 so far available would suggest that the January-to-June period may have been more profitable than the second half. Certainly the pick-up of earnings in the first half is impressive. One company which reported a quarter million loss in the first three months of 1933, had cut that figure exactly in half in the same period of 1934. Another firm reporting for the first quarter of 1934 showed a profit rise of 300% over the same period in 1933. The September 1934 strike was foremost among several factors militating against good returns in the July-to-December period. Typical of the adverse result of these contingencies was the report of a leading silk-and-rayon weaving company which showed a healthy profit rise in its yearly report May 30, 1934, but a decided profit shrinkage in the six months ended Nov. 30, 1934.

In the opening months of 1934, fabric output, both in all-silks and in mixtures, was running well ahead of orders, and stocks were rapidly accumulating, representing a threat to market stability. By order of the Code Authority the entire industry embracing 900 mills with 70,000 looms shut down for the week of May 14 to 21; the result of this action was that May's output total was 22% below April. The reduction had a tonic effect on the industry and this influence continued even into the quiet mid-summer months; were it not for the subsequent labor difficulties in September undoubtedly the mills would have enjoyed a more profitable second half year. In the velvet division, for example, prices, though still allowing only a meager margin, were strong and these mills enjoyed spirited buying at profitable levels.

If proof were needed of the new confidence which 1934 brought to the broadsilk industry, this would be found in the fact that the strike, though it seriously delayed business in the middle of a promising season had no lasting adverse effect on market tone. Indeed, silk's merchandising picture was a healthy one throughout the year. Thanks to curtailment, broadgoods production in 1934 totaled approximately 406,000,000 yd. against 474,480,000 in 1933, reflecting the improved inventory position. Yardage sales for 1934 were estimated at 405,000,000 against 511,980,000 in 1933.

HIGH-LIGHTS OF THE YEAR

Silk

Peter Van Horn named chairman of Silk Textile Code Authority, elected president of Federated Textile Industries. (March 2)

Old Silk Association finally gets its new name all set and starts using National Federation of Textiles, Inc. (March 26)

Open-price provisions of throwing code bring profits, according to Dean Hill, secretary of code administration committee. (May) (But then the throwing industry voted to abandon the provisions in August!)

All mills operating under Silk Code Authority close for week. Affected: 900 mills, 70,000 looms, 30,000 workers. (May 14-21)

R. D. Jenkins appointed vice-president and general manager, International Silk Guild, succeeding Ernest L. Starr. (May 21)

H. E. Bishop appointed secretary Throwsters Research Institute and Code Administration Committee, succeeding Dean Hill, who became executive director of Mercerizers Association of America. (June 15)

Ramsay Peugnet given leave of absence after 25 years of service with National Federation of Textiles and its predecessors. Luther K. Bell appointed treasurer of the federation and of Silk Textile Code Authority. (June 15)

Silk Manufacturers Association, representing broadsilk weavers of Paterson area, agrees to bury axe and join Broad Goods Division of National Federation of Textiles. (June 29). (P.S. The axe isn't very deeply buried!)

Opponents of design piracy gain victory when N. Y. Federal Court permanently enjoins Adolph Meirowitz from violating code provisions protecting designs. (July)

From 25 to 40% of mills closed by strike. (September)

"Silk Parade" starts in New York and moves westward, with one-week stands. (Sept. 10-17)

Survey shows 85% of throwsters oppose any further curtailment of machine hours. (September)

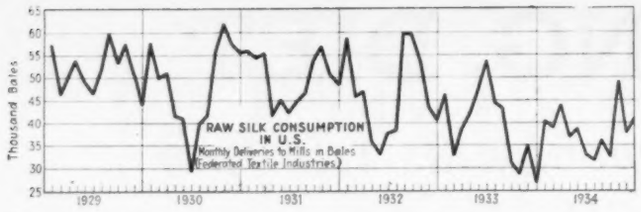
Luther K. Bell resigns as treasurer of Silk Textile Code Authority and of National Federation of Textiles. His duties are taken over by A. A. Clune. (Nov. 12)

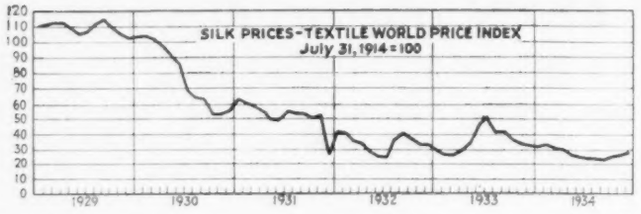
National Federation of Textiles holds bang-up meeting in N. Y. Much time given to Washington affairs and members get the low-down. (Dec. 7-8)

Promotion Is Successfully Used

THE steady rise in raw silk prices obviously was a favorable factor, and this, together with promotional activity, made for steady and spirited sales throughout the fall months. In evaluating the promotion, it must be kept in mind that the broadsilk industry is no longer a one-fiber division and profits equally whether its output be silk or synthetic yarn merchandise. The significance of the work of the International Silk Guild, therefore lies in the fact that it has helped to stimulate sales both of the all-silks and mixed fabrics.

Study of market trends through 1934 show that the





much-talked-of consumer movement toward quality in broadsilk fabrics is something more than just a "paper opinion." As early as last June buyers were veering away from the excessively low-priced lines, and they showed less resistance to higher prices, as was evident in the increased demand for the $1.50 and $1.75 fabrics. This trend became more manifest at the turn of the year.

It is clear too that broadsilk merchandisers are determined to maintain the momentum built up in their 1934 sales effort. Both individually and collectively they are planning a year of spirited sales promotion.

Self-Criticism Is Chief NRA Gift

NOBODY looking for a NRA keynote of the twelve-month period could do better than focus on the significant two-day session of the silk industry held in last December. It might almost be said that the entire year was a prelude to the enlightened purpose, the new cooperation and the spirit of frank self-criticism which marked that meeting.

With respect to 1934 as a whole, it is doubtful whether any textile division underwent more fundamental—and more progressive—change than did the silk industry. Glancing back, we find the Silk Association completing its transition and emerging as the National Federation of Textiles, Inc., which organization embraces about a score of related but independent textile units. This varied group, including broadgoods, raw silk, ribbons, tie fabrics, and related divisions, had come officially under the Silk Textile Code when Peter Van Horn took office as chairman of the Code Authority.

It has been said, and no doubt rightly, that a major accomplishment of the Silk Code Authority in 1934 was its intelligent restraint of production which helped materially toward healthier market conditions. Unquestionably the two-week shutdown in May, averted a serious overproduction crisis and contributed to the improvement that was manifest in the fall.

However, the broader value of the NRA seems rather to lie in the definite psychological change which has come over the entire industry. Conservative by instinct, tradition-bound in policy, the silk textile branch now seems to have definitely abandoned that rôle in favor of a more liberal attitude. The decision of the Federation and the Code Authority last fall to cooperate in a complete re-study of the code, on the theory that probationary days were over and the code now should be built into permanent form, was typical of the industry's new far-sightedness.

Many specific benefits accrued to silk through NRA during the year. Outstanding among these is the legal ban on design piracy, which the courts have affirmed and which gives every promise of permanence.

Profit in Silk Is Contingent Upon Effort

THE question of whether silk as a fiber will make profits for textile mills during 1935 is contingent upon three big "ifs." Briefly, these provisos are: first, if standards and classification methods are brought up to date through the medium of a new international raw silk conference; second, if Japan takes further steps toward regulation of quality; and, third, if the raw silk market increases its support of the merchandising drive to stimulate consumption of all silk merchandise.

Considering the improvement manifest since last October, it would be easy to build a glittering picture of silk's 1935 prospects. Indeed, even when studied with a conservative eye, the statistics are encouraging. Raw silk deliveries in 1934 came close to equalling those of 1933, according to figures of the National Federation of Textiles, Inc. The totals were 461,706 bales in 1934 against 469,427 in 1933. Monthly deliveries declined steadily through the early months of 1934, falling to 37,392 bales in April, but shipments took an upward swing in May with 38,740 bales; after normal fluctuations, this improvement carried through in October, 1934, to the impressive figure of 66,479 bales—an increase of 50.6% over September and 72.2% over October, 1933. Raw silk price movement paralleled deliveries, but to a more moderate degree: Crack Double Extra 13/15 white, 78%, key trading number, weakened through the spring of 1934, declining from $1.52½ on March 1 to $1.16 on

Silk Prices and Mill Activity for 1934

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	1934 Monthly Average	1933 Monthly Average
PRICES														
Textile World Index Number														
Raw Silk	32	34	31	30	27	26	25	25	24	26	27	29	32.2	35.4
KEY QUOTATIONS*														
Raw Silk Crack XX 13/15, white 78%	1.47	1.58	1.52	1.40	1.25	1.21	1.19	1.17	1.11	1.21½	1.21	1.35	1.37	1.61
Thrown Silk Tram Stnd. Japan 85%	2.12½	2.27½	2.17½	2.07½	1.92½	1.92½	1.85	1.92½	1.80	1.85	1.95	2.00	1.98	2.48
Spun Silk 60/2	2.95	2.95	2.95	2.95	2.95	2.95	2.95	2.95	2.95	2.95	2.95	2.95	2.95	2.65
ACTIVITIES														
†Silk Deliveries (approximate bales)	40,942	39,021	44,080	37,392	38,740	33,069	32,021	36,247	32,599	49,106	37,548	40,941	38,476	39,119
Stocks, end of Month (bales)	83,820	74,607	62,828	61,083	61,060	59,048	66,268	58,694	76,645	66,479	76,502	65,934	67,747	62,804
Machinery Activity % of available looms used on basis of 80 hours per week per loom.														
Broad Looms	51.8	64.3	63.2	57.0	38.6	46.7	42.1	45.9	35.8	28.8	49.8	§45.6	45.1	‡74.8
Narrow Looms	31.7	36.6	37.0	36.3	31.4	26.1	23.1	28.6	27.4	21.0	31.1	§34.2	30.4	‡75.4

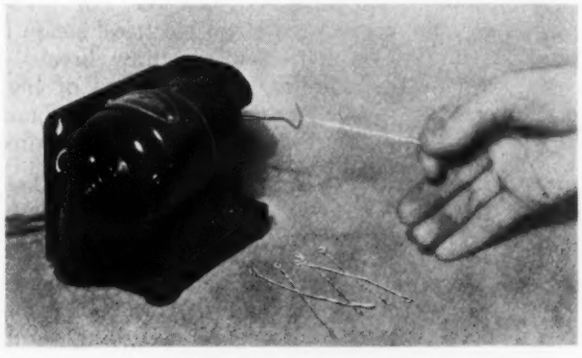
*First of month. †Includes re-exports. §Estimated. ‡As Machinery Activity Statistics for 1933 were computed on % of capacity based on 1925-27, the 1933 monthly average figure is not comparable with that of 1934.

July 26, thereafter gaining steadily through fall to $1.32½ in December.

Among the favorable signposts for the coming year is continued promotion of all-silk merchandise; especially notable is the effort put forth by the International Silk Guild, which has greatly stimulated silk consumption and should help further in that direction this year.

Throwsters and Weavers Raise Technic

AT an important meeting on raw-silk problems held in the spring of 1934, the representatives of hosiery manufacturers were asked to tell what methods they were using for testing evenness. Man after man arose to say that he was using the nine-meter test. Few developments in the technology of the silk industry have taken hold so rapidly as has this new evenness test developed only two or three years ago by Warren P. Seem, of Julius Kayser & Co. The reason of course lies in the great need which the hosiery manufacturers have had for some means by which they could purchase silk with fairly accurate knowledge as to its ring-producing tendencies. The sweeping progress recently made by



Twisting 9-meter silk test skeins

the three-carrier method of knitting has reduced but by no means eliminated this need.

Like most developments which lead to more rigid quality specifications, the new evenness test is looked upon more favorably by the buyer than by the seller; and indeed the raw-silk dealers are placed temporarily in an embarrassing position, since they are obliged to buy on the seriplane test and sell on the nine-meter test. No matter how well-intentioned they may be, they find themselves offering silk to manufacturers which does not come up to the quality expected. However, during the year Japan received serious and very pointed criticism from the National Association of Hosiery Manufacturers with respect to the quality of the silk she was shipping here; and the opinion is held that she will be open to reasonably early recognition of the new test. The proposed International Technical Raw Silk Conference, if held soon, will be a step toward this end.

In throwing, too, the trend of the times is toward more accurate testing. One indication of this is the number of stroboscopes which are to be seen in use. Mainly these are employed to check the speed of spindles in order to insure accuracy of twist, but they also show the condition of the yarn while twisting and are useful in checking the speed of motor pulleys and transmissions. Throwing has become the home of the stroboscope, an instrument unknown to textile men a few years ago.

Another instrument which has come into rather extensive use was also practically unheard of a few years ago. This is the density gage or density meter for testing silk and rayon cones, cops, spools, and other yarn packages. Its purpose is of course to insure that all packages are wound with the same tension in order that they will unwind uniformly and without sloughing off. Up to 1934 there was only one such instrument on the market, but during the year two new makes appeared.

Several new skein winders were placed on the market. Their outstanding features include adjustable speed, elimination of spindles for high speed and reduced doffing time, simplified design and construction, oilless and ball bearings, convenience and increased number of adjustments, and freedom from vibration. A new oil-less-bearing redraw frame has twister-type take-up and automatic arrangement for lifting each bobbin out of contact when its thread breaks. Another is spindleless.

The outstanding development in cone winding was the introduction of a pineapple-shaped package especially designed for three-carrier full-fashioned knitting. It requires a special attachment for the winder and is said to offer free, and hence even, delivery, without danger of the yarn catching on the lower taper. The tapered nose of the cone assists the operative in placing knots quickly. An efficient quiller tension was developed.

A new reel-type warper for silk and rayon is equipped with a bank of drop wires suspended over an electrode bar at the creel. A signal light assures the operator that the stop motion is in working order. A lease dial can be set to stop the warper automatically at the required leasing intervals and at the end of a section. The automatic control is said to permit a speed of 110 yd. per minute; and it is estimated that an additional 5% in production is gained through elimination of any need for the operator to slow down the machine. A new light-model portable tying-in machine is suitable for silk, rayon, and fine cotton.

The year was responsible for little change in weaving equipment, the shuttle-changing 2x1 box loom of the previous year undoubtedly offering sufficient progress for the time being. This loom was installed extensively in 1934; the shuttle-changing idea proved its practicality.

Although silk and rayon weavers were confronted with no innovations in weaving equipment, they did have to wrestle with some unfamiliar fabrics. However, the silk men resigned the bulk of the trick weaves to the rayon weavers; and in fact the "Silk Parade" was rather disappointing to the extent that it did not develop a great deal that was unusual in silk materials. It is in the novel effects that rayon has its best opportunity to conceal its identity; and therefore the use of silk in such weaves, except in the top-quality fabrics, is to little purpose. With silk and rayon prices where they were in 1934, the 50/64s prints, 70/76 French crepes, and other old standbys offered the principal opportunities for volume production. A number of the materials played up in the "Silk Parade" were not all silk, but contained synthetic fibers too. However, the higher brackets continued, as usual, to initiate and develop new constructions, for others to imitate, and enjoyed a return on them for a time. These brackets showed a tendency to adhere more strictly to silk than had been expected.

The Raw Silk Committee of the National Association of Hosiery Manufacturers was the first organization to adopt as standard the terms "S" and "Z" proposed by TEXTILE WORLD in August for designating the directions of yarn twist.

PRACTICAL HELPS for Silk Overseers

TO WARP un-soaked silk remove all but one roller from the table of the warping machine. Place this roller within ½ in. of the paddle. Fasten a piece of sponge beneath the roller, large enough to rub the underside of the roller wider than the band. Keep this sponge saturated with a 50% solution of soaking oil.

•

TWIST TESTING should be carried out in a systematic manner. Test the first four spindles of each machine the first day, the next four spindles the next day, and so on until ready to start anew.

•

IN PREPARING metal yarns to be used for decorative warp effects in silk fabrics, make certain that the beam is even, as any loose ends will show up badly on the face of the cloth. Metal filling yarns should be put on the quills as tightly as possible, and the shuttle packed with fur to prevent sloughing off of the slippery yarn.

•

WHEN WEAVING all-silk, turn-up satins, the timing should be slightly earlier than usual, the tension must not be too heavy, and the reed must move freely.

•

FOR CHECKING spindle, motor-pulley, and transmission speeds, and for examining yarns while twisting, a stroboscope and a tachometer are most necessary pieces of throwing-plant equipment.

•

IF UNEVEN twist is found in silk crepe yarns, excessive play in the driving mechanism of the spinning machine is usually the cause of the trouble. Check the machines carefully and replace all worn-out parts.

•

IN WEAVING plissés, the warp must be set wide in the loom to allow for the shrinkage caused by the warp ridges and dense enough to prevent the filling from kinking up between the ends in finishing. A good construction is 60/3/2 reed set 50 in. in reed and woven plain with a 20/22 Japan crepe warp and 104 picks of 4-thread 13/15 Japan crepe filling.

•

TO DETERMINE whether silk has been properly set, take off 4 to 6 ft. of the yarn from the package and allow it to hang as a free loop. If the yarn is not properly set, the loop will twist up.

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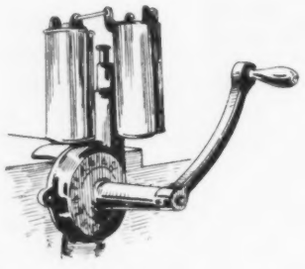

THE TAKE-UP value of soaking solutions can be determined by means of a Babcock milk tester. The difference in the percentage of fat in a fresh and in an exhausted solution divided by the percentage in the fresh solution is the percentage of take-up.

•

SILK-SOAKING compounds should act as softeners and plasticizers. Make sure that the soaking agent does not have a waterproofing effect which will prohibit good yarn setting.

•

AN ATTRACTIVE cotton-filling fabric can be made by using a ground warp of organzine in the gum and a satin warp stripe of organzine which has been boiled off and then warp-sized with gelatin. When the goods are wet out and dyed in a dark shade with a direct color (green, for example), the silk in the gum will dye so heavy a shade that it will appear black, while the satin stripe will be green.

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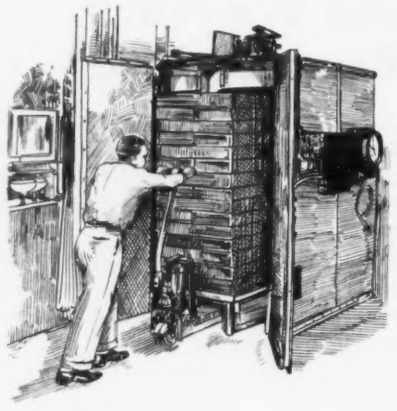

TWIST-SETTING of 13/15 crepe yarn in an electrical steam box results in fewer redraw breaks per spindle-hour and a thread of higher tensile strength than are obtained with silk steamed in the ordinary home-made box.

•

WITH A 600-end creel, a silk warper should separate 600 bobbins into four groups according to their weight. When his bank is run down to the skin, he should run to the end of his section and tie on the heaviest group of 150 bobbins; at the end of the next section repeat the process with another 150 bobbins. Thus in four sections he will complete his bank.

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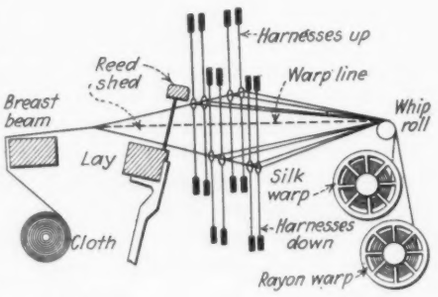


HAVE THE whip roll slightly lower in weaving crepes than for single-end satins, and be sure that the shed is diamond-shaped. To obtain this shape, run a cord or straightedge from the breast beam to the whip roll, and with a level line up the roll even with the breast beam.

These items have been culled from the 1934 issues of TEXTILE WORLD.

KNITTING

International News

"MOST IMPORTANT..."

Knit goods industry's greatest need for 1935

Lies in Field of Merchandising

I believe that the biggest practical service which we can render the hosiery industry in 1935 will be in the field of merchandising. We have developed in the past year a very practical and effective Cost Manual. We must encourage and induce the widest application of the principles and methods outlined in such Manual, thus improving and spreading sound knowledge of costs. We must make further progress in the direction of standards of construction. It is a safe statement that the American hosiery industry produces the finest hosiery produced in the world. Our weakness is not in our ability to manufacture, but in our ability to merchandise, and in our determination and courage to have a real voice in the making of the price of our product.

Earl Constantine, *managing director, National Assn. of Hosiery Mfrs., New York.*

Sound Cost Accounting Methods

The most vital contribution to better order in the knitted outerwear industry is the propagation and use of sound and intelligent cost accounting methods. The code in its labor provisions has tended toward the standardization of labor costs, thus eliminating the sort of unfair competition that redounds ultimately to the detriment of labor. In its trade practice provisions it has tended to standardize the important conditions of sale and thus to concentrate attention on price alone. For the elimination of destructive price cutting, for the constant stabilization of employment, and for more profitable operation it remains for all manufacturers to become more conscious of their costs and more conscionable in their pricing.

Harold R. Lhowe, *executive director and counsel, National Knitted Outerwear Assn., New York.*

Sell to Get Fair Profit

The Planning Division of our Institute has just prepared comparisons of prices which show that prices have been kept down according to the spirit of NRA. However, the knitted textile prices are so far out of line with other prices that the most important thing to be done during 1935 is to merchandise our products in such a manner that the mills will get a fair profit.

Trend of Textile and General Wholesale Commodity Prices (1926 = 100)

Date	All Commodities	Textiles and Textile Products	Knit Goods
December, 1932	62.6	53.0	49.3
December, 1933	70.8	76.4	71.2
June, 1934	74.6	72.7	62.8
December, 1934	76.9	70.0	61.9
Jan. 12, 1935	78.6	70.0	63.5

Roy A. Cheney, *managing director, Underwear Institute, New York.*

Production Control the Big Problem

When the hosiery code was originally formed two years ago, it was difficult—from a lack of statistics—to get at just how many hours would be necessary to produce the correct production. Two 40-hour shifts were finally established, and it looks as though this will be the correct production for the full-fashioned industry.

Dr. Taylor's recent book on the seamless hosiery industry shows that over half of the seamless ladies' machines are operating on double shifts. It seems to me that the terribly demoralized condition in the ladies' seamless field today is due to this increase in double shift operation. Just how to answer this production control question is the problem of the industry, and it is a big one. It may be that the best solution after all would be to cut down seamless production, certainly 260 needle ladies'—and coarser—to one shift of 40 hours.

A. H. Carr, *president, Durham Hosiery Mills, Durham, N. C.*

Sell Better Product at Fair Price

Our industry should strive to raise the standard of its product and to sell the public on economy in buying better underwear at a fair price rather than inferior underwear at what later proves to be a high price, thus working toward clearing the market of sub-standard and inferior merchandise.

E. J. McMillan, *president, Standard Knitting Mills, Inc., Knoxville, Tenn.*

Cultivate New Markets

Increased volume of sales is, in my opinion, the most practical objective for the textile industry during 1935. The cultivation of new and profitable fields for textile products would seem to afford the key to many perplexing problems. Rising production costs can best be taken care of by finding fresh outlets for broader channels of distribution.

J. Frederick Talcott, *James Talcott, Inc., New York, and director, American Hosiery Co.*

Do a Good Selling Job

My answer must be the same as it would have been last year or five years ago. DO A GOOD SELLING JOB, which starts with a harmonious organization producing a good article, a properly trained selling organization, intelligent use of advertising, good managerial services and adjustments on a fair and equitable basis.

You see I have hung everything on to that phrase "Do a good selling job." I don't believe any amount of regulation, however good it may be, can take the place of individual effort in selling, which includes the whole process of successful management of a business.

J. A. Zehntbauer, *president, Jantzen Knitting Mills, Portland, Ore.*

A COMMON CAUSE

Similar problems face hosiery, underwear and outerwear mills

Better Knowledge on Sales Position

IT IS outside the scope of this article to discuss the moot question of whether knit goods' three branches—hosiery, underwear and outerwear—should consolidate into a single unit, as some protagonists hold. However, in our study of the industry's progress through 1934 and into 1935, we could not but notice the striking parallel which presents itself among the divisions as regards both the accomplishments of 1934 and the unsolved problems of 1935. And this aspect merits some attention.

Let us take the benefits first. End-year inventory indicates that all three groups gained the following advantages in substantially equal proportion in 1934: (1) a clearer understanding of production and sales position thanks to improved statistical services; (2) stimulated sales, due to fundamental style changes and technical developments; and (3) a moderately improved financial status.

Then too, the parallel extends to the unsolved problems of 1935. The three chief issues confronting the three knit goods divisions might be classified roughly as follows: (1) increasing competition presented by mills operated by Federal relief funds—this has shown itself principally in the hosiery and outerwear branches; (2) labor relations; and (3) need for reducing production costs through modernization of equipment.

As a matter of fact, a general study reveals many important problems which the three trade branches shared to some degree last year. Labor difficulties? The hosiery industry fared better in the September strike than might have been expected, yet certainly the issue was acute enough while it lasted; the underwear mills were the proverbial "innocent bystanders" in that strike—and they suffered accordingly, 10% out of 75% of the Underwear Institute's membership being closed by "flying squadrons"; the outerwear mills found their production halted by serious strikes on several occasions.

The tally between divisions is scarcely less manifest in the field of style changes and manufacturing trends: Hosiery has its three-carrier, easily the biggest single profit influence of 1934 and the most promising for 1935; underwear had its "snuggies" family which was an excellent business-getter and led the new trend to increased wool content; outerwear had not only the important style changes in swimsuits, but also significant activity in sport dresses, ties, scarfs and novelties which made 1934 an outstandingly successful year for certain groups.

At this point, however, the parallel weakens. Each of the three divisions still has an abundance—even a superabundance—of problems which are peculiar to itself. In order therefore to give them their proper focus, these problems will be considered in their respective departments.

Hosiery: Hosiery mills ended 1934 in a much better position than they began it. That was particularly true with respect to production and sales, and for this progress credit must go to the improved statistical service which kept manufacturers more fully informed on the industry's current status than had ever been possible before. Knitters knew early last summer that hosiery stocks were rising perilously; they instituted a plan of voluntary curtailment which proved so successful that the end-August inventory of 17,318,222 doz. pairs was the lowest since March.

The Hosiery Code Authority reported that 1934 shipments totaled 103.4 million dozen against 105.0 in 1933, which was an abnormal year.

The financial picture, while far from ideal, was encouraging. Most mills held their own last year, and not a few stepped ahead. One interesting slant was that mills making both hosiery and underwear appeared to fare better in earnings generally speaking than those making hosiery alone. Few 1934 reports are available, but it is likely profits for the second half will prove to be below expectations; there is at least a suggestion to that effect in the fact that most hosiery shares on the New York Stock

HIGH-LIGHTS OF THE YEAR

Knitting

Mills go back to usual hours at end of 40% curtailment period. Market likes results of output cut. (Jan. 22)

Southern Hosiery Manufacturers Association elects R. O. Huffman president at Asheville meeting. (Jan. 27)

National Knitwear Exposition in New York draws 50% increase in exhibitors. (Feb. 12-16)

Discussion of code occupies National Knitted Outerwear Convention. (Feb. 13-14)

Underwear Institute meets in Washington, reorganizes to provide more equitable representation, elects Sherman P. Haight president, plans to cooperate with National Association of Hosiery Manufacturers in Knitting Arts Exposition. (Feb. 20)

Ringless hosiery rapidly becoming market factor. (March)

Annual Knitting Arts Exposition in Philadelphia. (April 23-27)

Hosiery Code Authority, at open meeting in Philadelphia, announces minimum price of $5.75 for 4- and 7-thread, 42-gauge run-fashioned. (April 23)

John H. Brine elected president of National Association of Hosiery Manufacturers, succeeding William Meyer. (April 25)

Hosiery Code Authority proposes, and then withdraws when backing is lacking, provisions for two-week shutdown between July 1 and Sept. 1 and adoption of 35-hour week on July 16. (June 21)

Following abandonment of curtailment program, John H. Brine, president of National Association of Hosiery Manufacturers, pleads for "voluntary" curtailment. (July 25)

Full-fashioned Hosiery Manufacturers of America vote to renew, for one year, agreement with American Federation of Hosiery Workers. (Aug. 3) (Workers sign on Aug. 29)

American Federation of Hosiery Workers calls strike in all mills not having contractual relations with the union. (Sept. 12)

Knitted outerwear mills plan 2-year, $300,000 promotion drive. (September)

Advisory committees of hosiery industry hold general conference in New York, set up special committee to study all phases of production control. (Nov. 19-20)

Exchange reached their highest levels in the fore part of the year, and dropped almost to the year's low in December.

Three-carrier hosiery, it need scarcely be said, was the chief merchandising feature of the year. This development helped greatly to stimulate sales, though indeed the uncertain legal status of the ringless patent acted as a deterrent to healthy movement. Threats of litigation between the 'ins" and the "outs" in the patent pool became serious shortly after the patent had been awarded on Aug. 7 to C. A. Kaufman, of Julius Kayser & Co. Negotiations looking to drafting of a contract that would be acceptable to both sides are now being pushed forward vigorously; it is recognized that clarification of this issue would greatly help ringless sales in the current year.

Two other aspects are important as regards the 1935 outlook for ringless: First, the profit prospects of three-carrier are luring many new firms into the business, which points toward increased competition; second, the need for standardization of ringless, to protect both the trade and the consumer, is acute.

Considerable progress toward adequate identification of hosiery for the consumer was made through cooperative action of representatives of manufacturers, retailers, and consumers. Since ringless promises to be a major line this year, it might well seem that standardization of this type should be a logical part of the broader program.

Underwear: Production control which has been so long a policy of the ribbed underwear mills that it really is second nature to them, stood these firms in mighty good stead last fall. Mild weather extended into winter, seriously delaying the sale of winterweights and, if it had not been for prompt curtailment by the mills, these firms would have ended the year with high inventories and low prices. As it was, quotations on ribbed underwear receded only slightly and prospects were against any sharp slide.

For the industry as a whole the 1934 earnings were somewhat above 1933; however certain firms which showed large gains in the preceding year reported a recession. Sales were especially good during the first quarter of 1934. In January and February new business nearly doubled production. But early spring saw demand decline rapidly; April brought a 50% drop in demand and there were further recessions through the summer. September of course, brought a seasonal rise for ribbed underwear. In that month jobbers and retailers were buying actively for November shipment and the total business at this period exceeded the same period in 1933. However, mild weather in October arrested this activity and started a let-up which continued virtually until the year-end.

Outstanding among style aspects is the trend toward woolen underwear for women. This is attributed to the extremism in design of "scanties" and to the fact that these models lack the necessary warmth for winter. It is noted by leading mills this season that many of the best-selling lines of women's underwear have wool content, some as high as 25%.

KNEE-HIGH HOSIERY

The attractive posing of models to illustrate the new knee-high hosiery gives the hosiery industry a new claim for attention. Style development in knee-high lines is mainly a matter of artistic designs at the top, where a band of an elastic textile holds the stocking to the leg. Note the lace-like pattern just below the top. (Courtesy, Holeproof Hosiery Co.)

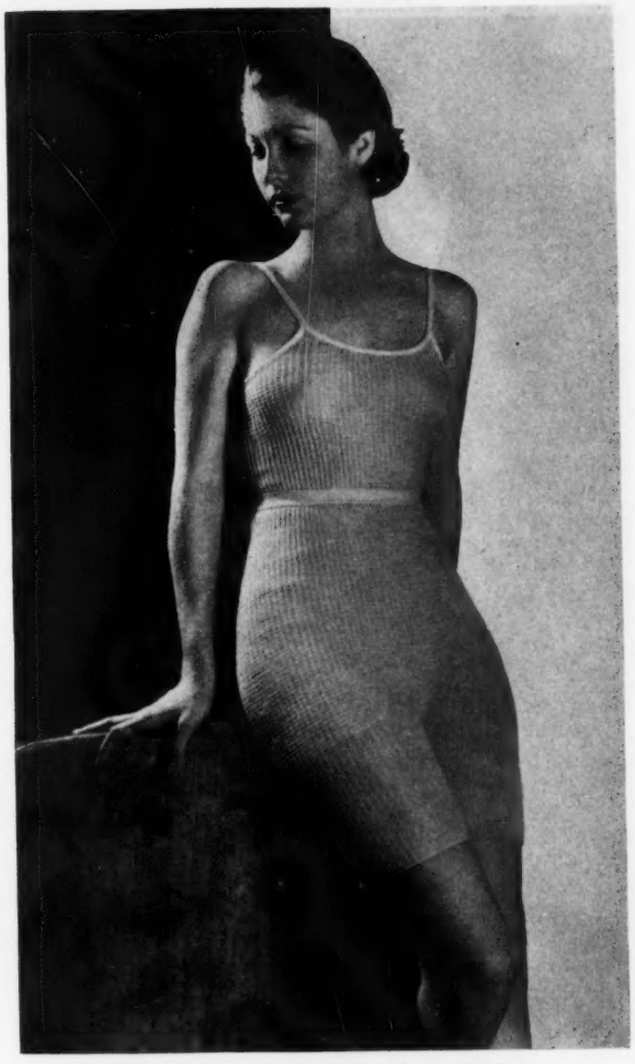
Outerwear: The knitted outerwear industry manifested a new strength and decisiveness in all its major divisions during 1934. This pick-up was so fundamental

Hosiery and Underwear Production in 1934

Compiled from figures issued monthly by the Bureau of the Census, Department of Commerce, in thousand dozens (the last three ciphers being omitted)

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Hosiery:												
Full-Fashioned	1,621	2,002	2,245	2,017	2,116	2,023	1,496	1,828	2,043	2,545	2,498	2,335
Seamless	1,652	2,299	2,671	2,643	2,818	2,352	2,179	2,595	2,331	3,137	3,144	2,693
All other lines	1 006	1,216	1,488	1,253	1,415	1,093	751	853	855	1,222	1,366	1,455
Total Hosiery	4,279	5,517	6,404	5,913	6,349	5,468	4,426	5,276	5,229	6,904	7,009	6,483
Underwear:												
Men's union suits—all weights	280	284	348	367	440	384	325	306	235	297	221	202
Mens' and boys' pullover athletic shirts—all weights	510	553	610	632	586	484	324	342	31	345	377	359
Women's union suits—all weights	130	106	124	142	155	153	93	120	88	110	92	71
Total underwear	1,414	1,518	1,750	1,893	1,965	1,767	1,381	1 423	1,295	1,550	1,355	1,129

NOW THEY WEAR WOOL



That vital factor in apparel purchasing—human comfort—has insisted that women's underthings for the colder months of 1935 must be both warm and fashionable. As a result the newest lines of undergarments carry a wool content up to 25%; however, symmetry of silhouette also is essential and this is maintained by careful design. (Courtesy, Van Raalte Co.)

that even if only part of the new vigor is retained during the current year the period should be one of good earnings. Despite the multitudinous set-backs of strikes, code adjustments, etc., manufacturers enjoyed a prosperous twelve months. Swimsuit sales in many cases were from 20 to 30% above 1933. One foremost swimsuit company reported that profits for the year ending Aug. 31, 1934 were 55% above the preceding 12 months. While the general pick-up was not as decisive as that, there is no question that the whole division is greatly improved.

The most notable strength was in the sweater, sports dress and infants' wear divisions. Manufacturers of these types of merchandise reported the second half of 1934 to be the best half-year they have had since 1929. Improvements in the styling of merchandise, and consumer replacement needs were believed to be the two chief reasons for the accelerated demand. Profit position of these mills in December was so satisfactory that some firms gave Christmas bonuses to their employees.

Equally significant as regards 1935 prospects is the industry's new sense of unity. This cooperative spirit has found outlet in the promotional drive now being conducted by the Knitwear Institute.

Mills Beset by Criss-Cross Code Problem

OVER - LAPPING jurisdiction — that thorn in the flesh of all code authorities —cost plenty of sleep in the knit goods industry during 1934. It cast its sinister shadow over all three divisions. One day the Hosiery Code Authority would be worrying lest these manufacturers should find themselves embroiled in the Graphic Arts Code—because, if you please, the knitters do their own printing! Next day a Siamese operation would be hurriedly performed to separate twins in the under- and outer-wear divisions. And, between times, like as not, secessionists would be darkly plotting to set up independent codes.

For the knitting trades as a whole, the year was crisscrossed with an extremely complicated pattern of code problems. However, despite the many NRA difficulties, the composite picture that presents itself is one of progress and substantial accomplishment.

Hosiery manufacturers struggled through a devious 12 months of setbacks and obstacles which seemed at times too hopelessly involved for solution. Analyzing the year in retrospect two broad gains are apparent. These gains were: (1) in evening up production and distribution through the 40-hour week; and (2) in an increased tendency toward cooperative effort. Among the specific achievements of the Hosiery Code Authority, the work of the code enforcement staff was outstanding. This unit did a difficult job in a manner at once competent and thorough-going. Wage violations for the industry up to August, 1934, affected 1698 workers, and involved a total sum of $46,280. This, as the Code Authority rightly said, was a very creditable showing, considering that the hosiery industry's entire payroll aggregates $120,000,000 annually for 145,000 workers.

The Code Authority's $5.75 maximum price ruling of last spring can be recorded as a step in the right direction, despite the fact that subsequent developments robbed it of its effectiveness. Production control, one of the industry's most vexing problems, lies unsolved on the doorstep of 1935, but an intensive study of this question has been started which may point the way to some solution.

Far-sighted action by the Underwear Institute as regards the NRA proved decidedly advantageous to this division. As early as February, 1934, when most textile divisions continued to regard the NRA as a temporary expedient, the Institute recognized that many NRA principles would become permanent and proceeded to readjust its structure on that basis; this move proved to be sound strategy as it equipped the Institute to handle with greater facility the many NRA issues arising during the year. Outstanding among the year's jurisdictional problems was the desire of the circular knit rayon fabric group for a separate code; the NRA finally settled the issue by putting this group under the Underwear Code Authority. Leaders in the tubular division showed commendable promptness in accepting the decision as final.

The interlocking of lines made by underwear and outerwear manufacturers created numerous knotty problems for these respective code authorities, but the end of the year found the boundary line between the two divisions

fairly well clarified. The outerwear industry has reason to be very satisfied with the 1934 record of its Code Authority; code enforcement helped toward improving the health of the market as is reflected in the current excellent financial state of leading outerwear firms. Various problems remain unsolved, notably the control of home work, and the "returned merchandise" controversy, and these are immediate issues of the new year.

Outerwear's chief benefit from NRA seems to have been an increased tendency toward cooperative action and toward elimination of trade abuses. This division, long avowedly individualistic, now is growing conscious of the evils of that attitude and the result of this changed viewpoint has been an increase in profits.

Rapid Gains in Knitting Technology

NO DIVISION of the textile industry makes more technical progress in a given year than does that which manufactures knit goods. Usually, however, the advances are largely confined to hosiery; but this year there has been a more generous sprinkling of developments through outerwear and underwear.

First in importance is the widespread adoption and successful operation of the three-carrier method of knitting full-fashioned hosiery. Although the controversy still rages as to just how the control of the patent—granted to Charles A. Kaufman, of Julius Kayser, on Aug 7—should be and will be exercised, the fact remains that "ringless" hosiery has in the space of little more than a year become a staple commodity.

Experiments are continuing—with here and there some limited commercial application of the results—on the elimination of rings in full-fashioned hosiery through the use of rayon; but the improvements afforded by the three carriers and by the nine-meter method of testing the evenness of real silk, as well as the continuing need for elasticity and strength in the yarn, make the advent of rayon as a generally acceptable full-fashioned raw material seem remote. Incidentally, a satisfactory ringless attachment for seamless machines has been developed and patented, but the small amount of real silk going into seamless hosiery renders the development of minor importance.

The advance in knitting technology which appears to be second to the adoption of three-carrier knitting—at least when measured by the scope of its possible effect—is also a hosiery development, although not confined entirely to full-fashioned. We refer to the rebirth of anti-run hosiery. It came as something of a surprise to American knitters to learn during 1934 that in England run-resist hosiery had not followed its American counterpart into oblivion. Rather, a certain type of seamless run-resist was being accepted by the British public—with its eyes open. This was the more astonishing because, in this country at least, women's seamless hosiery is expected merely to follow full-fashioned hosiery, and not to show any initiative of its own.

It is well known that the principal trouble with anti-run hosiery in the past has been its objectionable distinctiveness of stitch. The successful English stitch, which is formed by means of a double-latch needle, differs little in appearance from the normal stitch; and it is understood that experiments are now being conducted across the water with a view to producing the same result on full-fashioned hosiery. The principal stumbling block thus far is the difficulty in developing a practical double-beard needle.

MENS' KNITTED ACCESSORIES

Distinctive styling and energetic merchandising of men's knitwear, notably neckties and sweaters, has played an important part in the significant improvement reported throughout the outerwear industry during recent months. The merchandise shown above was displayed at the Knitwear Fashion Show held at Grand Central Palace in February. (Courtesy, Knitwear Institute)

Also in production in England is a seamless hose containing an individual warp thread in each wale. Since no warp thread extends from one wale to another, the run-proofing quality of warp fabric is attained without the sacrifice of elasticity; and the stitch appears normal to the naked eye. In this country, Van Raalte has, apparently independently, developed the same idea in full-fashioned hosiery; and it is this latter arrival which will probably bear the most watching. It is evident that the matter of run-proofing is about to hold the center of the stage again.

In New York last June was held a meeting which Dr. Emley, of the Bureau of Standards, declared to be epoch-making. Its purpose was to win the approval of hosiery, retail, and consumer men for the recommendations on hosiery grading and labeling made by the full-fashioned hosiery manufacturers' committee on construction standards. Approval in principle was obtained, but

the adoption of specific standards is still in abeyance. There has been considerable discussion as to the psychological effect on the consumer of various names proposed for the grades, which are based mainly on number of courses in the hose, it being felt, for example, that "Grade B" would cause the potential purchaser to discount the value of the hose more than would be justified. After construction standards have been adopted, they will be followed by standards for classifying hosiery on the basis of rings and other defects.

We have pointed out that women's circular hosiery is in the main a follower and imitator of full-fashioned. The reason is, of course, economic. Men's circular hosiery, however, justifiably boasts a very decided individualism. To a minor extent, women's hosiery is now even showing some tendency to follow half hose—in its trend toward shorter lengths. The ankle-length half hose has now been on the market about two years, and its popularity is gradually increasing—particularly for sports wear. Women's-hosiery manufacturers are launching knee-length stockings for spring. In the case of both developments the gate-opener has been Lastex.

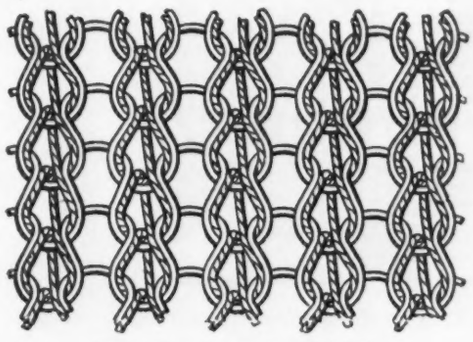
An innovation in half hose for spring is terry fabric. Most of the hosiery of this character is being produced on diagonal-stripe machines, the auxiliary sinkers drawing more yarn than usual and leaving long loops on what would normally be the inside of the hose. This means that the stocking must actually be worn inside out. New in 1934 was reversible reverse-plated hose, neatly finished inside and out, to give the wearer two choices of pattern. Mesh half-hose will be on the market again for spring. More wool half-hose was sold during the winter than usual, but not so much as the manufacturers had expected.

Many were the improvements in half-hose machines, although most of them served more to extend the design capacity of previously limited models than to extend the designing capacity of half-hose knitting as a whole. In the latter light, however, may be considered the application of shogging to the 80-individual-needle-wrap machine. To the half-hose machine which knits the rib top continuously with the body of the hose was applied needle reverse plating and wrap striping. A new wrap stripe attachment can be applied to plain and 12-step reverse-plating machines. Other improvements in seamless-hosiery equipment include a rib-top transfer which renders it unnecessary for the operator to insert her hand in the cylinder or to turn the machine by hand after transferring, the application of mock wrapping to ribbed-instep machines, provision for extending the heavy fabric a greater distance under the square heel, and improvements for insuring even knitting on the split-foot machine.

The automatic welt-turner and needle-and-point alignment device for full-fashioned hosiery machines which seemed so close to commercial reality early in the year failed to reach the market in 1934, due to financial barriers. A semi-automatic welt turner, however, was applied to the single-head full-fashioned hosiery machine, as was also an automatic rack back. An instrument for testing the wearing properties of hosiery, particularly with respect to resistance to garter and knee strain appeared.

The extent to which the rayon manufacturers have gone into the manufacture of underwear, directly and indirectly, has forced very many mills to turn from underwear to the manufacture of outerwear. Such mills have found it necessary to install numerous design attachments for their old machines and even to purchase entirely new machines. An unusual number of mills have had machines especially built to order during the year so that they might surprise the trade with original novelties.

Of particular interest among new machines for the underwear and outerwear trade is a 12-step-presser individually-operated spring-needle circular model equipped for comparatively instant (often 1 min. as against a day) change of pattern and for an increase in design capacity of 600% over the previous 2-step model. The high-production fine-gaged latch-needle machine for this trade, which has among its numerous features an individual stroboscope for each yarn feed to insure uniform setting of the stitch cams, is being operated by the new Lawson Knitting Co., in Pawtucket, but has not thus far been announced as generaly available to the trade. Laying-in and shaping attachments for elastic yarns were applied during the year to eyelet-rib machines to provide a combination of comfort, fit, and ventilation in girdles. Synchronization of automatic feeds developed in sewing machines for attaching button-hole facing strips to knitted undergarments



Face of new run-proof fabric

serves to prevent puckering without manual control of the tension.

A new yarn having a fine and extremely flexible metal core was brought to the attention of the trade in the year under discussion. It can be made with cotton, wool, rayon, or silk covering and can be knitted without modification of the machines. Through attachment of the core of a completed garment to a battery or electric outlet, the entire apparel can be made to radiate a mild and uniform heat. Sweaters have been knitted of the new yarn, gloves also, and socks.

Data on the properties of underwear fabrics had until 1934 been very meagre. In September, however, the Bureau of Standards published a research paper (No. RP711) reporting the results on an extensive series of tests on thermal transmission, air permeability, thickness, weight, compressional characteristics, and coefficient of friction of 97 such fabrics. The work is little more than a foundation upon which to build further data through additional research, but certain tentative conclusions drawn from these early results bear important implications. For example, it appears that spun silk may have some peculiar property which renders it particularly resistant to heat transmission and air permeation; that bleaching of cotton fabric may increase its thermal transmission and decrease its air permeability, compression, compressibility, and compressional resilience; that for any specific air permeability considerable variation in thermal transmission is possible, and vice versa; that both of the preceding can be varied considerably for any fabric thickness or weight; that warp-knit fabrics are less permeable by air than plain filling-knit fabrics of the same thickness and greater weight; and that rib-knit fabrics are as resistant to air permeation as fleeced fabrics of greater thickness.

PRACTICAL HELPS for Knitting Overseers

WASHBOARD effects in three-carrier hosiery are minimized by using cones of 4 oz. or less, changing all three cones when one runs out, and using three cones of uniform hardness or softness on each section.

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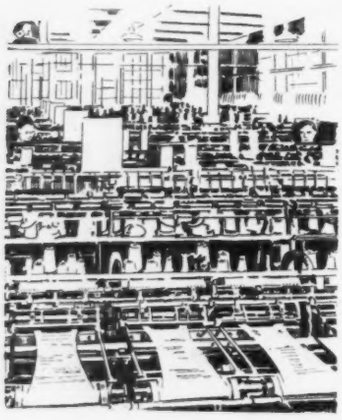

A RAY of sunlight coming through a transom and falling on the narrowing rod of a full-fashioned machine has been known to cause the rod to expand and throw the narrowing fingers out of adjustment. A piece of cardboard placed in the transom ended the trouble.

•

HOLES IN rayon underwear fabrics frequently are encountered when the machine is started up on Monday mornings. This is due mainly to the drying of the cones by exposure to dry air over the week-end.

•

SOFT-NATURED silk and soft soaking will cause pin stitches in full-fashioned hosiery, regardless of what adjustment is made to the machine. Hard soaking, on the other hand, will produce sleaze.

•

CURLING of balbriggan after the cloth is cut can be prevented by running the fabric after it comes from the knitting machine, through a solution containing 3 oz. of cornstarch to 1 gal. of water. The starch will stay in the goods until they are cut, but will work itself out before the garments are boxed.

•

A USEFUL formula for determining the number of needles per inch for leaded needles commonly used on loop-wheel circular knitting machines is the following: Double the gage and divide by three. This formula is easy to remember and obviates the multiplication of fractions.

•

PIN STITCHES in full-fashioned hosiery are frequently due to maladjustment of the machine. To overcome the defect, first make certain that the needles are lined up evenly from one end of the head to the other. Then check the verge plates, spring jacks, needle bar, take-up straps and rollers, number of weights, welt bars, and moistening devices.

•

THE TENDENCY toward unbalanced loop formation in full-fashioned knitting is lessened by use of two take-up straps for each section of the machine for the entire length of the stocking, including the welt.

•

IF THE paraffin used for waxing knitting yarns softens too much in the summer, blend with some carnauba wax, ceresin wax, candelilla wax, etc., having a higher melting point.

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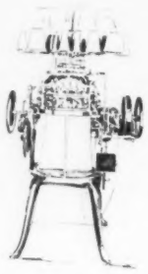

DIRTY MACHINES and improper oiling are the worst sources of stains on circular-knit underwear fabrics. Hanger boxes fitted to overflowing with oil will cause the shafting to throw the lubricant in all directions. Waste permitted to accumulate on the shafting will absorb oil and, when saturated, will throw it off to land on the cones or bobbins.

•

CIRCULAR-HOSIERY knitters are often bothered by failure of latches to open. If this trouble occurs after the finished stocking is pressed off the needles, the trouble may be due to a faulty latch opener. It is not uncommon for the circular-brush type of opener to be improperly set.

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A SIMPLE TEST to determine whether a particular soaking solution will cause pitted needles and sinkers is to wrap a sample of the thrown silk around several new, clean sinkers, place in a test tube, and cork tightly. The test tube is placed in a warm room, and the condition of the sinkers noted from time to time.

•

LUBRICANTS should be carefully and sparingly applied to the needle, guide, sinker, and presser mechanism of flat-bed machines. A highly refined oil with a viscosity range of 75 to 100 sec. Saybolt at 100° F. is recommended.

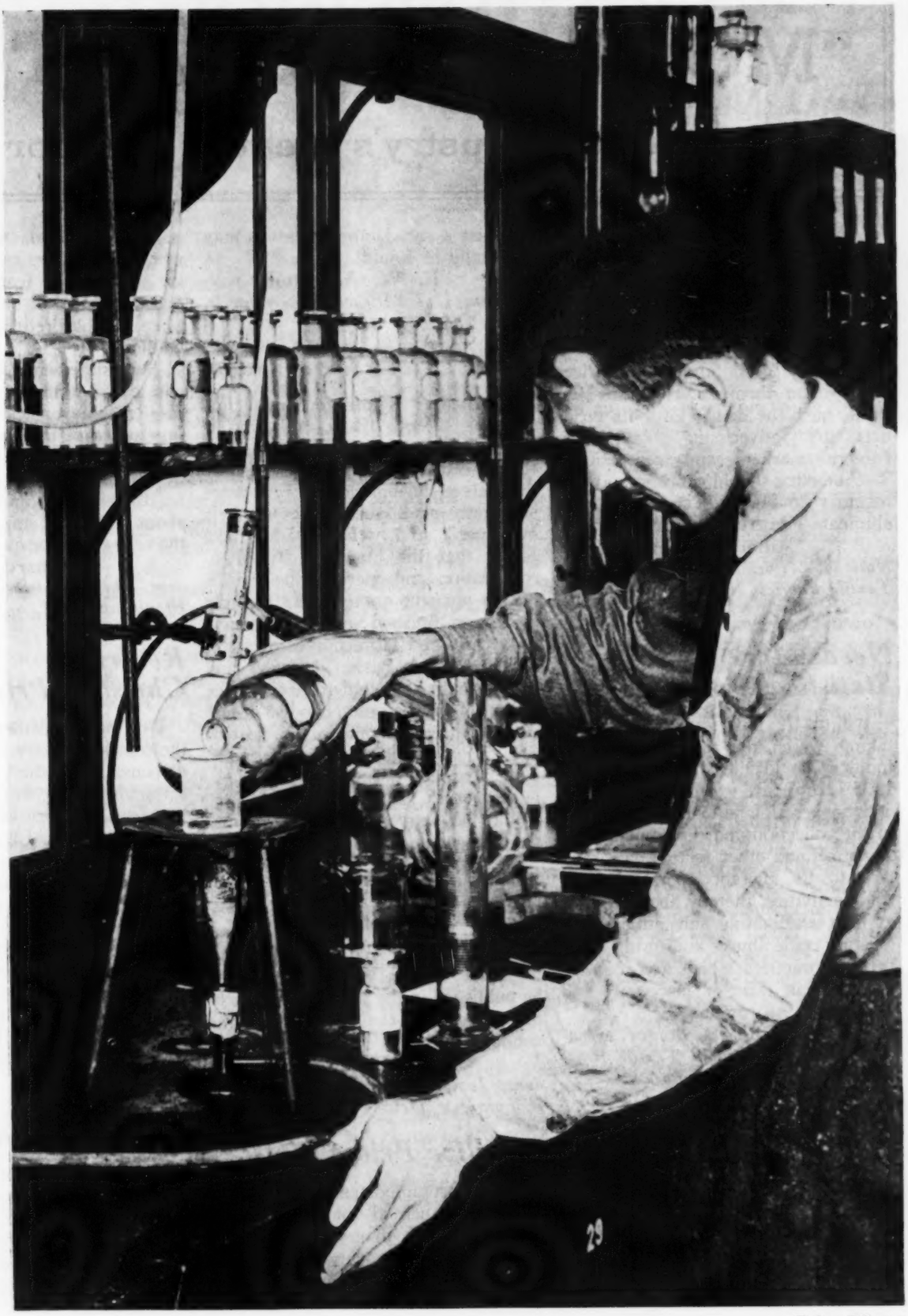
•

ACCUMULATION of odd lots of half hose can be prevented by marking with the correct size, style, and color, all "reboards" and "redyes" thrown out by the inspector-pairers. These are returned to the dyehouse, where they are put in bins. When dyeing of a new lot is started, the dyer looks over the stock in the bins, and about 10 min. before his dyebath is exhausted, adds to it any goods of a similar style and color which have been returned for redyeing and refinishing.

These items have been culled from the 1934 issues of TEXTILE WORLD.

PROCESSING

PROCESSING



Ewing Galloway

"MOST IMPORTANT . . ."

Processing industry's greatest need for 1935

Eliminate Destructive Price-Cutting

The cotton finishing industry should, during 1935, develop more confidence in its own profitable future, study costs and make prices based upon them, develop new designs, push the demand for its products by advertising, investigate foreign markets and competition. The industry should continue to work together to stabilize conditions and eliminate destructive price-cutting.

Albert L. Scott, *president, National Association of Finishers of Textile Fabrics, New York.*

Needs More Statistical Data

I think the most important undertaking which the textile processing industry could and should do during 1935 is to secure greater coordination and cooperation among its members in the collection and dissemination of statistical and other factual data relative to its current operations and trade activities, thereby abolishing, or at least eliminating substantially the existing trade abuses and unfair competitive practices which are founded chiefly upon false or inaccurate and misleading information.

Stanley R. Stager, *executive manager, National Textile Processors Guild, Inc., New York.*

Must Solve Competitive Problem

In my opinion the crying need in our branch of the industry is the necessity of a solution for the competitive problems of the corporation or mill finisher versus the converter and job-finisher combination. This competition has been ruinous to all concerned, and while much talking has been done about it, no feasible means has been found to solve the problem. I hope it will continue to receive the thought and attention of the various interested branches of the industry and that a satisfactory solution may eventually be found.

R. W. Arrington, *vice-president, Union Bleachery, Greenville, S. C.*

Open Prices the Answer

My answer is fair and reasonable finishing prices. How this may be accomplished is a difficult question, for, as a matter of fact, the finishers themselves during the last few years have only made such prices at their own peril, and, when made, have found that the business drifted to corporation and merchandise finishing set-ups who quoted and still quote prices on finished goods that have proved by and large non-competitive on a profitable basis. If ways and means could be found to prevent the selling of finished merchandise at less than replacement value of the cost of finishing, plus the cost of grey goods, plus reasonable merchandising expenses, the job finishing industry would be immediately and permanently benefited.

In my opinion, the simplest and most direct would be to have a daily report of the yardage of staple goods, and the prices at which they were sold, filed with a disinterested bureau, the summary of which would be published in the trade papers without revealing the names of the vendors.

John Bancroft, Jr., *president, Joseph Bancroft & Sons Co., Wilmington, Del.*

Stabilize Prices

The most important single thing that our branch of the industry can do during 1935, in my opinion, is to effect a closer cooperation between the converter, corporation finisher and job finisher, with the definite purpose of stabilizing prices for both finished goods and finishing services at a point where there will be a reasonable return for at least the sound units in the industry, in order that we may maintain our present wage scales, increase employment and level out our curve of activity through the stabilization of the market to a point where purchasers can enter the market without the fear of violent fluctuations, and last but not least, make a reasonable return to our stockholders.

This statement, I realize, will be considered extremely theoretical and idealistic; nevertheless, I am not willing to accept the fact that the competent heads of as important an industry as our own cannot cooperate together in such a manner as to bring about very great improvement vital to the very existence of our industry.

Leonard S. Little, *president, The United States Finishing Co., Providence, R. I.*

Return to Christian Principles

I do not think that our branch of the textile industry needs any special dispensation in the year 1935. What this industry is suffering from is a mass of Federal and State regulations and taxes. Like all other industry, it has been on the operating table and studied and dissected and analyzed for so long that it has not much strength left. What we need, along with the rest of the country, is a return to the principles of the Christian religion and the precepts of our fathers that made this country great.

J. K. Milliken, *treasurer, Mount Hope Finishing Co., North Dighton, Mass.*

Modernize Equipment

In my opinion the most important thing the textile processing industry can do during 1935 is to install the most modern equipment possible for every operation, as every economy is going to be vitally important.

In addition to this, keep all present equipment in A-1 condition. There is no doubt but what industry will be obliged to continue to absorb more taxation than ever before. Therefore, every economy must be practiced to meet these conditions.

Harry C. Wolfenden, *R. Wolfenden & Sons, Attleboro, Mass.*

THEY KNOW THE WORST

Processors understand underlying causes of their troubles

Finishers Seek Key to Profitable Operation

ENGINEERS from Massachusetts Institute of Technology now conducting experiments in fog removal at airplane landings are disproving Mark Twain's well-known statement that everybody complains about the weather, but nobody does anything about it. This encourages us to the belief that sooner or later something will be done to improve finishing prices and stop the perennial complaints regarding the condition of the textile processing industry.

At the beginning of 1934 it appeared that a start had been made in the right direction. The 25% curtailment of cotton finishing machinery activity effective in December, 1933, continued through March, and finishers seemed determined to raise processing charges to a reasonable level. The volume of business rose steadily during the first quarter, then declined rapidly to hit the low spot of the year in July. Prices dropped even faster than production, and profits on textile investment, which averaged about 5.13% for the first two quarters, were transformed into an average loss of 10.32% for July and August. Meanwhile, from June 4 to Aug. 25, a modified general curtailment was made effective. In the fall, production again rose, and prices were somewhat strengthened. The year ended with the prospect of the usual seasonal increase in demand for finished goods, and the hope for more stabilized conditions in 1935.

Sales of Domestic Coal-Tar Dyes

Year	Lb.	Year	Lb.
1927	98,339,000	1931	85,220,000
1928	93,303,000	1932	73,591,000
1929	106,071,000	1933	98,229,000
1930	89,972,000	1934	87,000,000*

*TEXTILE WORLD estimate.

In the dye industry the increased demand for vat colors is perhaps the most significant trend of the year from the viewpoint of the textile man. The steady decline in the call for vat dyes which set in late in 1929 was temporarily halted in the spring and early summer of 1933, then continued until December of that year. Early in 1934 a turn for the better occurred, and the demand slowly gained momentum, this trend continuing into 1935.

In view of the trend in recent years toward vertical integration, one event of the year which should be noted in passing is the acquisition by Pacific Mills of the merchandising of M. C. D. Borden & Sons, Inc., textiles, and the decision of the Bordens to reorganize the American Printing Co. as a job finishing plant.

The silk and rayon finishing division during the last year suffered from all of the evils of price cutting which afflicted the cotton section, and, in addition, was confronted with a strike which for six weeks paralyzed practically every dyeing and printing plant in northern New Jersey, New York City, and Long Island. A two-year agreement ending the strike was reached on December 2, which provides for union recognition and arbitration of all differences between employers and employees. Interruption of production because of labor troubles has been all too frequent in the Paterson area, and it is trusted that the present armistice will run its full term. That mill owners are not too optimistic is evidenced by the fact that several have moved their plants to other localities or have signified their intention of doing so as soon as plans can be completed. Naturally, only those companies which are in a good financial position will be able to make such a move. Due to their better credit rating, these organizations are now able to purchase dyes and chemicals at substantially lower prices than can many of the smaller, poorly managed companies. With the added advantages which are expected to accompany the relocation of their plants, these firms should, in the long run, be able to operate at considerably lower costs than those which of necessity remain in the Paterson area. It is very possible, therefore, that we shall witness a geographical decentralization of the silk and rayon dyeing division during the next few years, causing a marked change in the industry's set-up.

Engineers from Massachusetts Institute of Tech-

HIGH-LIGHTS OF THE YEAR

Processing

Official seal adopted by Textile Designers Guild and identification of designs starts. (Jan. 11)

Printing machines limited to 75% of normal operation. (February)

Code of National Textile Processors Guild, covering job dyers of raw stock, yarns (except silk), wool knit goods and woven fabrics, becomes effective. (Feb. 5)

Curtailment of printing machines extended through March.

Strike among some of smaller Paterson dyehouses settled within a few hours. (March 12)

In first case of its kind, Allied Dye & Print Works, Inc., Clifton, N. J., is fined $1,000 for violation of hours provisions of Silk & Rayon Dyeing & Printing Code. (April 6)

Amendment to code of fair competition of textile processing industry allows Code Authority to establish lowest reasonable cost of service or product in case of emergency. (April 27)

Radiance Piece Dye Works, Paterson, fined $1,000 and Greenville (R. I.) Finishing Co. fined $1,500 for violation of machine-hour limitations. (April 27)

General Wm. N. Haskell, executive director of Code Authority for Rayon & Silk Dyeing & Printing Industry, states his belief that any price control features in a code are undesirable. (May 23)

Curtailment of 25% in cotton-finishing machinery for period of 12 weeks put into effect. (June 4)

New NRA interpretation provides that where worker is engaged in more than one type of work, pay should be higher of two minima. (July)

Strike called in silk and rayon dyeing and printing plants in Paterson area. Workers demand 30-hour week, closed shop, 20% increase in wages. (Oct. 24)

John F. Evans elected chairman of Code Authority for Rayon & Silk Dyeing & Printing Industry, succeeding Gen. Wm. N. Haskell. (Oct. 22)

National Association of Finishers of Textile Fabrics issues cost manual developed to meet the particular needs of the cotton finishing industry (October)

Strike in Paterson ends, Institute of Dyers and Printers signing 2-year contract with Federation of Silk & Rayon Dyers and Finishers providing for 36-hour week. (Dec. 3)

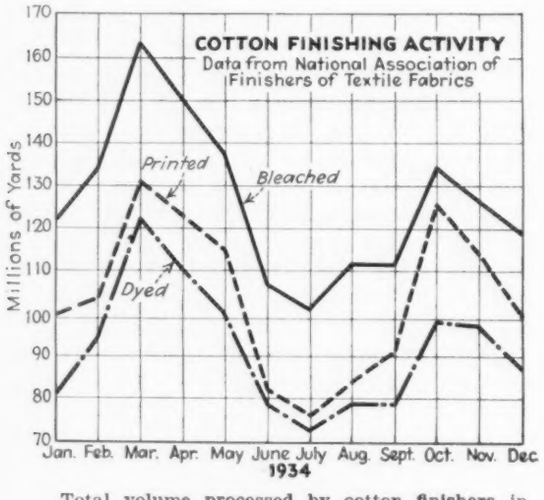
nology are now setting up equipment with which they hope to realize the dream of the alchemists and transmute lead into gold. It is conceivable that in the near future a greater number of finishers will find the way in which red ink can be changed into black.

Many Codes a Prime Problem for Finishers

IT IS not difficult to take a clock apart; but when an attempt is made to put it together again, one often finds that there are too many parts. The textile processing industry with its 33 divisions is somewhat the same. When one starts to determine how it is functioning under 20 different codes, it soon becomes apparent that there are too many parts. In the main, therefore, we shall concern ourselves only with the three most important divisions—the cotton finishers, the silk and rayon finishers, and the groups united in the National Textile Processors Guild.

In the cotton finishing branch, an extensive study by the cost committee of the National Association of Finishers of Textile Fabrics resulted in the publication last fall of a cost manual developed to meet the particular needs of its members. Through its president, Albert L. Scott, the association has urged all finishers to follow the methods outlined in the manual and to base selling prices on costs so obtained. Last month the stabilization committee of the association proposed a plan whereby a reasonable number of printing machines would be purchased or regulated in order to relieve the industry from the destructive effects of grossly excessive productive capacity and to prevent the forced sale of printing machines at ruinous prices.

No radical changes were made during the year in the code governing the processing of cotton and rayon fabrics, but according to an amendment approved in August, piece-dyeing machines are now considered to be "productive equipment" only when used in the production of unprinted fabrics. More recently the time extension sub-committee for the finishing branch of the cotton textile industry has been empowered to pass on applications for additional productive machinery in that branch. In August again, N.R.A.'s new policy of affording relief to small concerns found its first specific application when the Industrial Appeals Board granted to a Rhode Island finisher a continued exemption from the 25% curtailment order covering the industry.



Total volume processed by cotton finishers in 1934 was 3,871,632,000 yd. Comparable figures are not available for previous years. TEXTILE WORLD's estimate is 4,400,000,000 yd. in 1933, 4,700,000,000 yd. in 1929 and 4,100,000,000 yd. for the 1923-1925 average.

In an attempt to solve some of their many problems, the silk and rayon dyers and printers have proceeded by the trial and error method. In the first two months of 1934 considerable difficulty was experienced in obtaining code compliance, and the Code Authority for that division decided to tighten up on code enforcement. It soon became apparent, however, that it was impossible to enforce the price-fixing provisions, and in May, General William N. Haskell, then executive director of the Code Authority for the silk dyeing industry, recommended that these provisions, and those requiring installation of a uniform system of cost accounting, be eliminated.

What appeared to be a constructive measure was the establishment in the spring of a central claims bureau with authority to adjust all claims of $100, or over, made by customers of the silk dyers. This plan did not work out as well as was hoped, and, after a trial of three or four months, was disapproved by the industry. In October, following the resignation of General Haskell, John F. Evans was elected chairman of the Code Authority.

At about the same time Peter Van Vlaanderen succeeded G. H. Conze as president of the Institute of Dyers & Printers. Some 80% of the companies engaged in silk and rayon finishing are members of the Institute. A number of other firms are affiliated with the Independent Dyers & Printers Association; and early in 1934 a third organization—Printers Associates, Inc.—was formed. The last two are now practically merged with the Institute.

The trade-practice code submitted by the National Textile Processors Guild, which became effective on Feb. 5, 1934, was later amended to include sixteen divisions, each of which is operating under its own rules of procedure and trade practice. The Guild has been extremely active in drawing together for their mutual benefit all these groups—most of them comparatively small in size, and until recently having no semblance of a central organization. Under Stanley R. Stager, chairman, the Code Authority for the division has collected and published a large amount of data on wages, hours of labor, and prices; it has appointed a committee to investigate and recommend standards of quality, nomenclature, etc.; it has obtained numerous rulings from N.R.A. officials which clarify wage minima and other code provisions.

Considering the processing industry as a whole, we find that in many instances individual companies handling various classes of materials are governed by two or more codes, some overlapping of code authority still exists, and the necessity for further centralization of authority becomes more and more evident as time goes on.

Many Varied Technical Gains in 1934

IN PREVIOUS years it frequently has happened that there has been some one technical development of outstanding importance in the field of textile processing. Looking back over the last twelve months we are impressed by the fact that advances have been made in many directions, rather than in one or two. For some time there has been a definite trend toward better control of bleaching, dye-

ing, and finishing operations. Progress made in this direction in 1934 is certain to result in a marked improvement in quality of many types of finished products and in worthwhile savings in processing costs.

Among the more interesting of these innovations is an automatic, moisture-content-control system for application on continuous dryers for cotton and rayon warps and all types of woven and knitted fabrics; the control instrument regulates both the speed and heat of the dryer and is designed to maintain within exceedingly close limits any predetermined moisture in the finished product; a continuous daily record of the controller's operation as to moisture is furnished by an indicating recorder. Operating on a different principle, is an improved automatic skein dryer which incorporates a conditioning section to insure a uniform regain of the yarn, and protective devices to prevent snagging or soiling of the skeins against the side walls of the machine. To enable the dyer to duplicate laboratory samples which are dyed in porcelain or glass and to reduce cleaning time between colors, a glass-lined, corrosion-resisting steel dye kettle of the reel type has been introduced. Positive-tension control, which makes it possible to employ the machine for a wide range of sheer and heavy fabrics is a feature of a new open-width soaper or washer; on this equipment each pair of squeeze or nip rolls is driven by an individual adjustable-speed motor built as a unit and incorporating a speed reducer. Several types of optical instruments have been made available for making color analyses, identifying weighting materials and metals in fabrics, and examining yarn and fabric characteristics. Considerable progress has been made also in controlling the durability of textiles, a device for testing the resistance to wear of hosiery being typical of the developments in this line.

ACCURATE CONTROL
Indispensable in railroading, is rapidly gaining recognition in textile processing.

From England comes the news of two new processes of more than ordinary promise. The first is a method of acetylating cotton yarns in such a way as to produce a textile which combines the strength and structure of cotton with the dyeing properties of cellulose acetate; viscose rayon acetylated in a similar manner is said to be unaffected by prolonged boiling in water, and insoluble in organic solvents. The other process is for the production of unshrinkable wool; this development was first announced about two years ago, but not until last December was it made public that the process comprises the treatment of wool—in loose form, or as tops, yarns, or fabrics—with gaseous chlorine or bromine.

Of the several new processes developed in this country, those which appear to be of particular importance include one for treating mercerized yarn in such a way as either to heighten or to retard its affinity for dyes, another for the dry carbonizing of raw wool, a third for fusing fabrics (employed thus far only in the manufacture of men's collars), still another for rendering textiles germ-proof, and a fifth for weighting silk by means of a solution of antimony trichloride. Incidentally, lead weighting of silk still continues to be a controversial subject, no definite conclusion having yet been reached as to the effect of lead weighting on the durability of silk or as to whether the wearing of lead-weighted garments involves a health hazard. Improvements have been made in finishing viscose-acetate taffetas to prevent warp slippage, in the gray calendering and embossing of rayon crepes to modify the appearance and handle, in the compounding of latex and its application to pile fabrics, in the utilization of flocks for the production of imitation suede, in the treatment of silk for direct knitting, and in the dyeing of naphthol colors to obtain brighter and faster shades. Research on the carbonizing process, on the effect of alkalis on wool, on the sizing of cotton and rayon, and on printing pastes are but a few of the projects started or continued during the year, which give promise of further advances in processing technic in the near future.

Preshrinking of cotton fabrics, as predicted several years ago, has now become a standard finishing process, and today in this country alone some 45 finishers have installed Sanforizing equipment capable of turning out nearly 500,000,000 yd. annually of preshrunk fabrics. Commercial production of anti-crease cottons and rayons, called by this writer the outstanding development of 1933, has not yet hit its stride; however both the merchandising and production angles are receiving attention, and two new methods for rendering textiles less susceptible to crushing and creasing have been announced recently.

Last year in this review the importance of the newer sulphonated compounds and other chemicals was stressed. Further applications for these compounds have been found during the last twelve months, and a number of new products have been added to the list. These include a cresol-free mercerizing assistant, an oil-base water-repelling compound said to be insoluble in water, a finishing compound for imparting a supple handle and silk-like scroop to rayon, a degumming agent containing buffered peptizing salts for use in the one-bath method of hosiery dyeing, and a chemical—sodium hexametaphosphate—which has the property of dissolving calcium and magnesium soaps in water or alkaline solutions.

Of the machine developments not mentioned previously, space permits only the bare listing of a few types of equipment which indicate the way in which the machinery builder is contributing to the progress of the processing industry. These are a continuous 10-compartment wool-goods washer capable of turning out 32-oz. fabrics at the rate of 27 yd. per minute; a tenter-dryer system designed to eliminate baking, steaming, or ageing of the goods; a print-works ager equipped with variable-speed drive and permitting any desired ageing time between 1½ to 7½ min.; a duplex Palmer which gives a uniform finish on both sides of the fabric; a cloth measuring and examining machine of exceptional accuracy and speed; several knit-goods finishing machines, including one which extracts, processes, dries, conditions, and folds tubular fabrics in one continuous operation; and sewing machines of numerous types, all evidencing the strides in the direction of higher operating speeds without sacrifice of quality. One growing trend of particular significance is the production of equipment designed especially for processing rayon yarns and fabrics; recently one of the better-known machinery companies announced its intention of entering this field even more actively than in the past and has engaged a prominent consultant on rayon dyeing and finishing to assist in the development of special equipment for this purpose.

We find then that each branch of the processing industry has made substantial technical gains and has paved the way for further progress in 1935.

PRACTICAL HELPS for Processing Overseers

GRAPHITE MARKS on knit goods can often be removed by treating the goods for 15 min. at 100° F. in a 1% solution of oxalic acid.

•

IN MERCERIZING cotton-acetate fabrics to improve their appearance, it is important to keep the caustic at a temperature of approximately 50° C. Rinse with cold water, as hot will cause hydrolysis.

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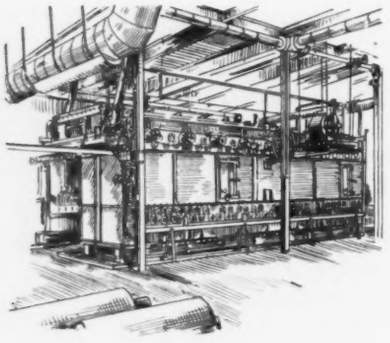

MARKING-OFF of vat prints can be caused by running a wet gray immediately before the printed fabric to cool the ager. Use only warm, dry, grays.

•

MOHAIR and wool have a tendency to "go wild" when agitated in hot solutions. Before scouring, pile fabrics made from these materials should be steamed in a closed chamber at 10 lb. pressure for 45 min. to prevent distortion of the pile tufts.

•

COTTON finishers have found that addition of a small amount of sulphonated oil and locust bean gum prevents dusting off of finishes composed of epsom salt, dextrin, and stearate softener.

•

STEAMING of wool crepes on the crabbing machine or steaming off machine should not be prolonged beyond 3 to 4 min. and the steam pressure should not be greater than 7 to 8 lb. Otherwise the goods may become glazed and acquire a thin, papery handle.

•

REDUCTION of certain sulphur dyes with sodium hydrosulphite, instead of sodium sulphide, results in increased fastness. This is particularly true of a number of blues, blacks, and greens.

•

ON A SWING-FRAME, inclosed tenter, the plain, cast-iron bearings on the width-adjusting shaft often cannot be lubricated satisfactorily and frequent renewals are necessary. If new stands designed to take a cheap ball-bearing which is never lubricated are installed, renewals will be much less frequent.

•

CURLING of plain knit goods made on a spring-needle machine with a single set of needles can be readily overcome by steaming. The cloth can be wound on a perforated tube plugged at one end and fitted with a steam connection at the other, or it can be processed on one of the simple machines which run the cloth from a roll over live steam, over a spreader, and then over a re-rolling device.

•

FLAMEPROOFING of cotton or rayon fabrics can be accomplished by padding the goods with a solution of 100 lb. ammonium phosphate, 40 lb. ammonium sulphate, 30 lb. ammonium chloride, 26 lb. boric acid, and 16 lb. borax dissolved in water to make a 100-gal. batch.

•

TO MAINTAIN a standard for white bleached goods, tint a skein of yarn or swatch of cloth to the shade desired with a fast-to-light vat color (not bleacher's blue, which will fade over a period of time). Wrap in wax paper and keep in a closed drawer or cupboard. Cut off small portions as required.

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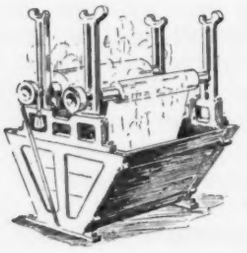

CLEARER SHADES are obtained in dyeing naphthol colors with Variamine Blue B salt if a sufficient amount of zinc sulphate is added to the developing bath to bind the alkali.

•

WOOL CREPES taken directly from the sewers and burlers to the washers frequently turn out streaky and cloudy after dyeing. If the goods are run for 20 min. in a fulling mill used merely as a soaping machine to wet out the material thoroughly, streaks and clouds will be avoided.

•

IN APPLYING pyroxylin coatings, the amount of plasticizer should not exceed three times the weight of the dry cellulose present in the mix. An excess will make the film tacky and soft and lower its tensile strength.

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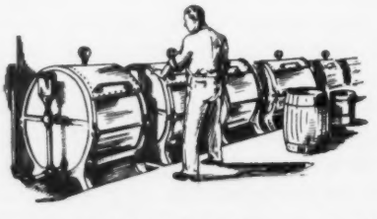

IF A HOSIERY dyer using the one-bath method is having trouble from grease spots or niggerheads, he will find it advisable to shift either to the split-bath or the two-bath method.

•

THE FINISHER should insist that the gray mill deliver rayon taffetas on small rolls, and not hooked or folded; otherwise he will encounter hooker-blade marks and bale creases which cannot be removed during the processing of the fabric.

These items have been culled from the 1934 issues of TEXTILE WORLD.

ENGINEERING

ENGINEERING

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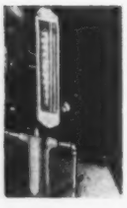
Power-Plant and Mill Engineer Lead Procession as Textile Industry Becomes

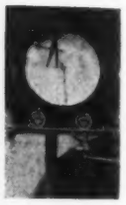
INSTRUMENT MINDED



IN THE considerable amount of revamping and modernization of power-plant equipment which began in 1933 and continued through 1934, there has been a marked trend toward automatic control of all phases of combustion. We find, in fact, that the whole textile industry is becoming instrument minded. This is true, not only in the power plant, but also in the mill. Steam generation, heating of dyebaths, humidification and heating of rooms, drying, and other operations are no longer carried on in the more progressive plants in the haphazard manner of a few years back. Instruments for indicating, recording, and controlling almost every conceivable process and operation are now available. Use of these instruments has resulted in lower production costs and better and more uniform products of manufacture. In addition, certain of the newer control instruments lessen the hazards of power-plant and mill operation. In considering some of the recent developments in power-plant and mill engineering, we should not lose sight of the importance of this trend toward instrumentation.

Turning first to the power plant, we find that a number of equipment manufacturers are prepared to furnish boilers, superheaters, water-cooled furnaces, stokers, pulverized-fuel apparatus, oil-burners, and combustion-control systems for any type of fuel. That is, the textile-mill executive or engineer who is contemplating the installation of a new steam plant can now obtain from one source all of the units needed. This means that equipment can be better coordinated, responsibility for proper operation definitely placed, and more satisfactory results obtained.

Stokers and pulverized-fuel equipment both continue to find favor. Stoker manufacturers are constantly improving their furnace parts in order to reduce maintenance costs. For example, the use of alloy cast iron for stoker parts is being investigated with the thought that possibly such material will resist better than plain cast iron the high temperatures of modern super-furnaces. Extensive studies have also been made to determine the effect of preheated air on stoker maintenance. Results of these researches show that up to 300° or 350° F. maintenance costs are not appreciably increased by a rise in temperature, but above these temperatures there is a marked increase. It is possible that the use of alloy castings will eliminate this undesirable feature and thereby favor the use of stokers with higher preheated air temperatures. Recently a control device has been developed to hold back the fuel—whether pulverized coal, gas, or oil—until the proper air flow has been established inside the furnace and thus to avoid the disastrous explosions which sometimes occur when a furnace is lighted.



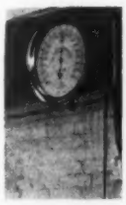
Steam turbines are being built to operate under conditions of higher pressures and temperatures than ever before, even if at the time of installation they are not to be subjected to these high conditions. Steam temperatures of 800° and 900° F. are being used, and this has demanded that special attention be given to the prevention of oil fires caused by the close proximity of the oil-circulating system to the high-temperature steam mains. Oil-storage tanks in the larger units are separated from the steam-carrying mains; the oil piping is inclosed in non-combustible drains or ducts, or is covered with heavy insulating material. In some installations, while a regular lubricating oil is used on the bearings, a non-inflammable fluid is used for actuating the governor and valve mechanism.

Extraction units are being used wherever there is a demand for process or heating steam. Recording instruments are now available for measuring the shaft eccentricity, bearing vibration, and shell expansion of turbines in operation. Head phones are used for detecting rubbing of the rotating parts.

A notable development in small steam turbines is the equipment of mechanical-drive units with extraction devices. These turbines can be obtained in sizes from 100 hp. upwards and built to withstand a pressure of 450 lb. They are multi-stage, thus giving maximum efficiency; the steam inlet valve is of multi-port type; and the extraction can be made at the stage best suited for the extraction pressure desired. It is also possible to use this extraction unit as a mixed-pressure turbine, employing low-pressure steam from some external source. These units should find application in textile plants where small amounts of low-pressure steam are required and no large extraction turbines are installed, or

at night and over week-ends when the larger extraction units are not in operation.

While the diesel engine has never been considered a very adaptable means of power generation for textile mills, recently a number of such units have been installed. Heretofore there have been two sources of considerable heat loss in diesel operation—the jacket water and the exhaust. These losses are greatly reduced in the modern applications. In one installation, for example, the jacket water at a temperature of 120° F. is used for feed water, and the exhaust gases at 700° F. serve as the heating media, leaving the boiler at 410° F. The thermal efficiency of the engine proper is about 32½%, the jacket water adds 27½%, and the engine exhaust 13%. This gives a total of 73%, a truly creditable performance.

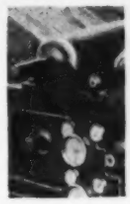


Further studies have been made during the past year in feed-water treatment, particularly along the line of combating corrosion. Water, even when showing "zero oxygen" by the Winkler test, can contain as much as 0.03 ml. of oxygen per liter. In order to remove this last trace of oxygen it is necessary to add to the water some chemical which will combine with the oxygen. Anhydrous sodium sulphite answers these requirements, combining with the last traces of oxygen to form sodium sulphate. The sulphate thus formed is incidentally valuable in helping to build up the sulphate ratio necessary to prevent embrittlement. The sulphite treatment is not recommended for removing the bulk of the oxygen content of the water, but only for that part which is not eliminated by the usual deaerating equipment. Zeolite softening equipment has been made entirely automatic in its action. When a predetermined amount of water has passed through one battery, the flow is changed over to another battery, and the first one is recharged, all operations being carried on automatically.

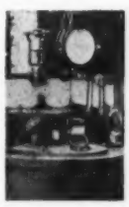
A novel application of the air compressor is for boosting the pressure of live steam to a higher pressure than that at which it was generated. For instance, there may be a demand for a small amount of steam at a higher pressure than that available from the boiler, and the demand is not sufficiently great to justify the installation of a higher pressure unit. In such a case, steam is taken from the main and compressed to the desired pressure in a standard-type air compressor.

The problems of waste and obsolescence are being given much attention, particularly in connection with power-plant operation. A recent survey conducted by *Power* indicates that the power equipment in textile mills can be classed as follows: 1 to 10 years old, 20%; 10 to 20 years old, 43%; 20 years old and older, 37%. Data collected show also that power costs range from 3 to 10% of the total cost of the product. If, as is asserted, the cost of producing power in some plants can be lowered 50% by reducing or eliminating power wastes, the cost of the finished product can be reduced from 1½ to 5%. Such a reduction might well serve to give a manufacturer a marked advantage over a competitor, or even to transfer his losses into profits.

Reductions in power wastes can be made by installing new equipment which can burn the cheaper fuels, by utilizing combustion-control apparatus, by operating with higher steam pressures, by using extraction steam, and—of importance—by obtaining closer cooperation between engineering staff and the mill executives.



Of the numerous developments in motors for textile mills, the most novel, perhaps, is a double-ended motor for looms, one loom being driven from each end of the motor shaft with a V-belt drive. Geared motors and pivoted motor bases are deservedly becoming more popular for textile drives, eliminating overhead shafting and long belts. Pivoted bases adapted for vertical and ceiling drives have greatly extended the field of application for this type of equipment. Recently the pivoted base has been adopted for the driving of spinning and twisting frames by mounting it on a shelf built at the end of the frame. In the past it has been customary in print works to drive the back-rigging and the printed-cloth dry cans and folder from the printing machine cylinder.



A new method, recently developed, which has been successfully applied in several plants is to drive each of these three units by a separate d-c. motor. The speed of the printing-machine motor is regulated by hand by the operator to suit the work; the speed of the other two motors is regulated by rheostats, which in turn are controlled by compensating gates. This method relieves the printing-machine cylinder of the strain of driving the other sections of the unit.

During the last few years engineers have given much thought to the economics of power transmission. One of the results of these studies has been the evolution of the modern group drive. It has been found in many instances that by the installation of group drives a mill can gain a considerable amount of flexibility without a large expenditure. Thus, in one weave shed, where 198 looms were being run by two motors, a plan was worked out whereby eleven 10-hp. motors would run eleven groups of eighteen looms each. This enabled a flexible arrangement at a cost approximately one-third of that required for individual motor drives. While there is still a lot of room for improvement in power transmission in most textile mills, each plant has its own particular problems in this con-

nection. For this reason, only a careful analysis of each case will determine whether individual or group drive is the better solution.

Much has been said in recent years in regard to welded construction replacing that of cast iron. There is no doubt that a large amount of welded work is being done, but cast iron still has some strong arguments in its favor. A noteworthy development in cast iron is a metal made in an electric furnace from 100% steel scrap (silicon steel punchings) and low-carbon, steel-plate scrap. It is heat treated and is a valuable substitute for malleable iron, as it possesses a tensile strength of 60,000 to 70,000 lb.

The uses of chrome-nickel steels continue to increase and become more diversified. At the same time, constant research is going on with the aim of improving the corrosion resistance and also the ease of machining the various types of these materials.

Electric Welding Torch

A new development in electric welding is a torch, operated from a 110-volt lighting circuit, and producing a flame comparable to that from an oxy-acetylene torch. This offers interesting possibilities in small plants and also as a portable unit in larger plants. There is also available an a-c, arc unit with a welding voltage of 40, which uses a heavily coated electrode in order to shut out the oxidizing gases. An improved electrode used for cast iron produces a low heat, which lessens the tendency of the metal to develop cracks. A Thyratron-tube-controlled equipment is recommended for spot and resistance welding of corrosion-resisting steels, alloys, and aluminum.

With the development of a new portable foot-candle meter has come new interest in determining and maintaining proper intensity of lighting in manufacturing plants. It has been determined that a minimum of 10 foot-candles should be maintained to eliminate eye strain, and also that, while the general industrial average is 5 foot-candles, many mills are operating with but 3 foot-candles. Aside from the health factor, it is a proved fact that proper lighting will increase production and reduce the number of seconds. One of these portable foot-candle meters is as necessary a piece of equipment in a plant as is a steam pressure gage or a voltmeter.

Disposal of Wastes

One subject which may engage the attention of all textile-plant engineers before the end of the year is the purification and disposal, other than into the rivers, of objectionable manufacturing wastes. All navigable rivers are under the control of the Secretary of War, and the Administration seeks to extend this control to include all tributaries to such rivers. It is planned to induce Congress to pass legislation to this effect, and then to enforce the cooperation of plants and communities to bring to an end the dumping of their objectionable wastes into all waters.

It will be recognized that forced treatment of textile wastes to render them unobjectionable will be extensive and expensive, requiring additional ground area, buildings, equipment, and labor. It is further planned to have the government set up a bureau which will be in a position to furnish expert engineers to advise in such disposal, and possibly loans will be available to plants and communities for carrying on the work. This matter deserves serious thought, because sooner or later it is certain to require action.

MACHINERY SALES

Again Increase in 1934, Approaching 1930 Level

◆ *This is the 1934 installment of* TEXTILE WORLD'S *annual survey of sales of textile machinery and accessories. It is presented through the cooperation of the equipment manufacturers who supply, in confidence, information on the change in their dollar volume, to be incorporated into a total. As a check against the accuracy of this survey, it was interesting to note last year that the 1933 Census of Manufactures showed approximately the same change from 1931 as did our figures for those years. . . . . The study now covers the six-year period, 1929-34 inclusive.*

THE upward trend in textile machinery sales, started in 1933, was continued in 1934 with the result that that year approached the 1930 level. The most significant facts disclosed by TEXTILE WORLD'S survey are:

1. Dollar volume of sales in 1934 was 12% greater than the 1933 volume. On the basis of the 1933 Census of Manufactures, this would mean that last year's sales of textile machinery, parts and attachments approximated $67,000,000, as against $60,000,000 in 1933.

2. The 1934 volume was 37% less than that of 1929—not so bad for a capital-goods' industry these days.

Based on 1929 as 100, the following table of index numbers shows the trend from that year to date:

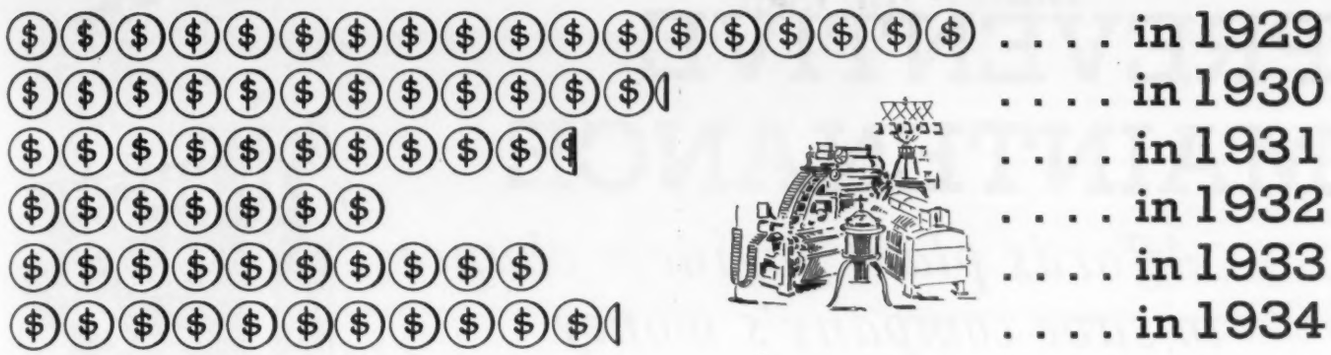
1929	100	1932	39
1930	67	1933	56
1931	57	1934	63

Again it must be emphasized that this a *trend* study only, and that the exact mathematical accuracy of the indices cannot be guaranteed. However, we have had ample checks on them during recent years to indicate that they fall with the realm of reasonable accuracy.

Breaking the industry down into its major groups, it is interesting to note that the group comprising preparatory, spinning and weaving equipment and the group comprising bleaching, dyeing and finishing machinery each registered a 6% gain in 1934 over 1933. Knitting machine manufacturers, on the other hand, averaged a 29% increase, while manufacturers of miscellaneous equipment and accessories showed a 17% increase.

What's Ahead for 1935?

There is no question about majority opinion among equipment manufacturers as to the future. Of those who contributed, 72% are definitely optimistic, 7% are pessimistic, and 21% are on the fence. In many cases the optimism seems more than a wish, because our correspondents wrote of actual increases in orders on their books for the first part of this year. However, the expectations are nearly all moderate; while a few manufacturers look for increases in dollar volume ranging up



to 50%, the majority talk in terms of 5 to 10%—and seem quite content to let it go at that.

Opinions vary between two extremes. At one end a man says: "The present outlook for 1935 appears to be considerably better than for several years past and we are very optimistic regarding new business." At the other end, a man says: "At the moment the outlook for textile machinery sales is not good. The mills are suffering acutely from demoralized prices; few of them are making any money at the prices now current; and all of them are hesitant about making machinery commitments so long as this condition prevails." These two men are the heads of two large companies in the same division of the textile machinery business. They are not, so far as we know, a confirmed optimist and a confirmed pessimist, respectively. So it seems like another case of "pay your money and take your choice." But, as we indicated above, the most substantial basis for hopefulness is found in the increase in actual orders reported by many. That talks.

Incidentally, one manufacturer takes a unique position. Instead of pinning the outlook on about every national and world problem, including the condition of schools in China, he says: "As for 1935, we believe from indications in our particular company that business will be better than in 1934, which fact we believe will be due largely to our own improved internal condition." That's a new idea.

Here, too, there is another extreme. A man writes: "The index on the front of *Business Week,* last issue, puts me in a quandary. The reports of the number unemployed, the momentous Supreme Court decision pending, the aftermath of the Saar plebiscite, budgets, and other important matters forbid the thought of substantial improvement at this time."

Bricks for the New Deal

As was to be expected, the Administration came in for a few brick-bats in the comments on the outlook. One of them, if printed, could involve us in a libel suit. Others were more moderate. Mostly, they point out the need for greater confidence, on the part of business, in what the Government is doing and is planning to do—not a new thought incidentally. The social reform program is regarded by at least one man as a threat to such confidence.

"It will all depend on how many monkey wrenches the Congress throws into the machinery this winter and what they finally decide to do with NRA," is one comment. And another: "We feel that 1935 should show a marked improvement over 1934 providing there is an utmost avoidance of new tax burdens and business—freezing restrictions and competitions, by every agency of Government."

Strangely enough, only one man lays any particular emphasis upon this matter of restrictions on installation of additional productive machinery—but he does a job for several by going into the subject exhaustively. These restrictions, he says, are still very seriously affecting his business.

Modernization Emphasized

Apparently, modernization is still the main source of sales expectation and actuality. This keynote is sounded through many of the replies.

"I believe that in the textile industry the sales opportunities for our type of equipment are as great as, or greater than, ever, in the simple theory that any mill which remains in operation and which hopes to attain successful operation must take advantage of every modern practice," comments a manufacturer of accessory equipment. "Renovation of present plants will materially expand in 1935, in our opinion," states a producer of textile machinery proper. And another says: "It is increasingly apparent that our industry is becoming more and more cognizant of the fact that obsolete equipment cannot produce merchandise profitably in a competitive market. Realization of this fact by manufacturers is creating a demand for new machinery and the prospects are such that we believe we can predict, without being unduly optimistic, that our 1935 sales will run substantially higher than 1934." These comments are typical of many.

The subject of exports enters this survey for the first time in several years: not in a big way, but enough to indicate some increased interest. "Our 1934 sales were larger than they were in 1933 largely due to a decided increase in export business," says one man. "Export has shown an appreciable increase with us of late," says another. "We feel quite sure the outlook for export machinery in 1935 will be much better than in 1934, as already there appears to be a development along that line," comments a third.

And, of course, the strike and the labor situation in general come into the picture. Those who sell to the textile industry seem to realize that the prospects are clouded by uncertainty on this score. "We feel that the labor situation in the textile mills is going to develop into a very serious situation," says one manufacturer. "The mills are still uncertain, of course, about the labor situation," is another comment. One man states bitterly: "If we had an Executive in whom ordinary businessmen had confidence and who wouldn't truckle to the unions, the country would have a wonderfully prosperous year."

Finally, here is a man who has found out how to make money no matter how business is: "In 1933 we ran at a loss; in 1934, because we did not spend as much money, we are coming out in black ink."

ADVERTISING PAGES OMITTED

PREVENTIVE MAINTENANCE

Affords plant engineer chance to save company's money

By H. H. Iler
Union Bleachery, Greenville, S. C.

OF THE many things which the plant engineer can do to reduce the use of red ink on his company's books, the one that will afford the greatest savings is, perhaps, the setting up of the adequate program of preventive maintenance. Such a program will lower repair and replacement costs to the minimum and will prevent expensive shut-downs of productive equipment.

Preventive maintenance calls first for machinery inspections at regular intervals. These inspections enable the engineer to determine what repairs are necessary and permit him—with the cooperation of the various foremen—to set up proper lubrication schedules.

When inspection of machinery is carried out under the direction of the engineer, the heads of the operating departments are relieved of a certain amount of worry as to the upkeep of equipment. In most plants, however, it will be found advisable for the latter to continue to be responsible for the condition of all machinery under their supervision. That is, reports of the findings of the inspectors are supplied to the department heads, and requisitions for repairs are left to their discretion. In this way, the overseer is kept informed as to the condition of his equipment, but he does not get the impression that someone else is trying to get control of it or to usurp his power.

Lubrication and care of motors, drives, line- and countershafts may best be regarded as a function of the maintenance department. Loose pulleys, and machine clutches, bearings, and gears can be included in the various departmental lubrication schedules. In the power plant, lubrication is a function logically belonging to that department; but the plant engineer should assist in drawing up the lubrication schedule and should keep informed as to whether or not the schedule is being followed. This applies also to the lubrication of equipment in the several productive departments.

Preventive maintenance includes also the periodical inspection of all auxiliary equipment, buildings, trucks, etc. These inspections should be scheduled for definite times and carried out on schedule. Proper maintenance of these items is usually the responsibility of the engineering department, and requisitions for repairs, painting, and similar work originate in that department.

Ranking next in importance to a program of preventive maintenance from the money-saving angle is the establishment of a system for checking the amount of power, steam, water, light, and supplies of various types consumed in the several departments of the plant. All engineers are familiar with the instruments and methods for making check-ups of this nature, and it is unnecessary to describe them here. It is human nature for the user of any material to economize in the use of it when he knows that someone is constantly checking up on him. In addition, hidden wastes are uncovered, which often can be prevented by use of control instruments or by other methods.

There are numerous other ways in which the plant engineer can save money for his company. From the engineering and trade papers he will learn of new equipment which will enable the mill to reduce costs, and he will find how men in other mills have solved problems similar to his own. But the plant engineer who is to succeed to the fullest possible extent in effecting economies must be more than an engineer. And it is this phase of the subject—which only too often is neglected—that we shall now consider.

The engineer must not limit his studies merely to subjects of a mechanical, electrical, and constructional nature; he must acquire a working knowledge of all phases of his plant's activities; he must get an understanding of cost-finding procedure; he must acquaint himself with personnel problems; he must develop a penchant for organization. Above all, he must be a diplomat, in the best sense of the word.

Since the engineer cannot hope to originate all of the valuable ideas evolved in a mill, he should seek ideas from department heads and others who are conversant with the details of the various operations in the plant. When he receives a suggestion—however foolish or trivial it may seem—he should give it careful and respectful consideration. If he makes use of somebody else's idea, he must make certain that he does not appropriate it as his own, but give full credit to whomever it may be due. Perhaps the best attitude for the plant engineer to take is to regard himself as an aide to all others in the plant, from the executive head to the humblest worker. When he has sold himself to all of his associates and has won their confidence and cooperation, the engineer can really make progress in plant economies.

Finally should be given a few words of caution. It often happens that the plant engineer hits upon some detail connected with the operation of the mill which apparently offers room for improvement. In many of these cases, however, what seems to be a simple problem resolves itself into a complex one. For this reason, changes which are made without careful consideration of all the factors involved may prove costly, rather than economical. On the other hand, when all of the facts have been marshaled and the data thoroughly analyzed, the engineer can be reasonably certain that any project which is undertaken with a view to reducing costs will give the results anticipated.